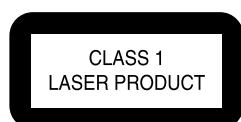


Service Service Service

TR 01001_001
080502

Service Manual



DVD+ReWritable



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PHILIPS

1. Technical Specifications and Connection Facilities

1.1 General:

Mains voltage	: 198V-276V
Mains frequency	: 43 Hz - 63Hz
Power consumption mains	: 28 W
Power consumption standby	: < 7 W
Power consumption low power stand-by	: < 3 W

1.2 RF Tuner

Test equipment:Fluke 54200 TV Signal generator
Test streams:PAL BG Philips Standard test pattern

1.2.1 System:

PAL B/G, PAL D/K, SECAM L/L', PAL I

1.2.2 RF - Loop Through:

Frequency range	: 45 MHz - 860 MHz
Gain: (ANT IN - ANT OUT)	: -6 dB to 0dB

1.2.3 Radio Interference:

input voltage /3 tone method (+40 dB min)	: no limit
---	------------

1.2.4 Receiver:

PLL tuning with AFC for optimum reception
Frequency range: : 45.25 MHz - 857 MHz
Sensitivity at 40 dB S/N : $\geq 60\text{dB}\mu\text{V}$ at 75 Ω (video unweighted)

1.2.5 Video Performance:

Channel 25 / 503,25 MHz,
Test pattern: PAL BG PHILIPS standard test pattern,
RF Level 74 dBV
Measured on SCART 1
Frequency response: : 0 - 4.00 MHz +0-4dB
Group delay (0.1 MHz - 4.4 MHz) : 0 nsec \pm 150nsec

1.2.6 Audio Performance:

Audio Performance Analogue - HiFi:

Frequency response at SCART 1 (L+R) output: : 100 Hz - 12 kHz / 0 \pm 3dB

S/N according to DIN 45405, 7, 1967 : and PHILIPS standard test pattern
video signal: : FM: $\geq 50\text{dB}$; AM $\geq 45\text{dB}$, unweighted

Harmonic distortion (1 kHz, ± 25 kHz deviation): : FM $\leq 1.5\%$; AM $\leq 2\%$

Audio Performance NICAM:

Frequency response at SCART 1(L+R) output: : 40 Hz - 15 kHz 0 \pm 3dB

S/N according to DIN 45405, 7, 1967 : and PHILIPS standard test pattern
video signal: : $\geq 60\text{ dB}$ unweighted
Harmonic distortion (1 kHz): : $\leq 0.5\%$

1.2.7 Tuning

Automatic Search Tuning

scanning time without antenna	: typ. 3 min. PAL
stop level (vision carrier)	: $\geq 37\text{dB}\mu\text{V}$
Maximum tuning error of a recalled program	: $\pm 62.5\text{ kHz}$
Maximum tuning error during operation	: $\pm 100\text{ kHz}$

Tuning Principle

automatic B,G, I, DK and L/L'detection
manual selection in "STORE" mode

1.3 Analogue Inputs

1.3.1 SCART 1 (Connected to TV)

Pin Signals:	
1 - Audio R	1.8V RMS
2 - Audio R	
3 - Audio L	1.8V RMS
4 - Audio GND	
5 - Blue/Chroma	
GND	
6 - Audio L	
7 - Blue out/	
Chroma in	0.7Vpp \pm 0.1V into 75 Ohm (*)
8 - Function	
switch	<2V = TV >4.5V / <7V = asp. ratio 16:9 DVD >9.5V / <12V = asp. ratio 4:3 DVD
9 - Green GND	
10 - P50 control	
11 - Green	0.7Vpp \pm 0.1V into 75 Ohm (*)
12 - Nc	
13 - Red/Chroma	
GND	
14 - fast switch	
GND	
15 - Red out/	
Chroma out	0.7Vpp \pm 0.1V into 75 Ohm (*) $\pm 3\text{dB}$ 0.3Vpp Chroma (burst)
16 - fast switch	
RGB/ CVBS	or Y <0.4V into 75 Ohm = CVBS >1V / <3V into 75 Ohm = RGB
17 - Y/CVBS GND	
OUT	
18 - Y/CVBS GND	
IN	
19 - CVBS/Y	1Vpp \pm 0.1V into 75 Ohm (*)
20 - CVBS/Y	
21 - Shield	

1.3.2 SCART 2 (Connected to AUX)

Pin Signals:	
1 -Audio R	1.8V RMS
2 -Audio R	
3 -Audio L	1.8V RMS
4 -Audio GND	
5 -Blue/Chroma	
GND	
6 -Audio L	
7 -Blue in/	
Chroma out	$\pm 3\text{dB}$ 0.3Vpp Chroma (burst)
8 -Function	
switch	
9 -Green GND	
10 -P50 control	

11	-Green	
12	-Nc	
13	-Red/Chroma	
	GND	
14	-fast switch	
	GND	
15	-Red in/	
	Chroma in	
16	-fast switch	
	RGB/ CVBS or	
	Y	
17	-CVBS GND	
	OUT	
18	-CVBS GND	
	IN	
19	-CVBS/Y/RGB	
	sync	1Vpp ± 0.1V into 75 Ohm (*)
20	-CVBS/Y	
21	-Shield	

(*) for 100% white

Crosstalk 1kHz	: >85dB
Crosstalk 20Hz-20kHz	: >70dB
Frequency response 20Hz- 20kHz	: ± 0.2dB max
Signal to noise ratio	: >85 dB
Dynamic range 1kHz	: >75dB
Dynamic range 20Hz-20kHz	: >70dB
Distortion and noise 1kHz	: >75dB
Distortion and noise 20Hz-20kHz	: >65dB
Intermodulation distortion	: >70dB
Mute (spin-up, pause, access)	: >85dB
Outband attenuation:	: >40dB above 25kHz

1.6 Digital Output

1.6.1 Coaxial

CDDA/ LPCM (incl MPEG1)	: according IEC958
MPEG2, AC3 audio	: according IEC1937
DTS	: according IEC1937, amendment 1

1.3.3 Audio/Video Front Input Connectors

Audio

Input voltage	: 2 Vrms
Input impedance	: >10kΩ

Video - Cinch

Input voltage	: 1 Vpp ± 3dB
Input impedance	: 75 Ω

Video - YC (Hosiden)

Input voltage Y	: 1Vpp ± 3dB
Input impedance Y	: 75 Ω
Input voltage C	: burst 300 mVpp ± 3 dB
Input impedance C	: 75 Ω

1.4 Video Performance

All outputs loaded with 75 Ohm
SNR measurements over full bandwidth without weighting.

1.4.1 SCART (RGB)

SNR	: > -65 dB on all output
Bandwidth	: 4.8 MHz ± 2dB

1.5 Audio Performance CD

1.5.1 Cinch Output Rear

Output voltage 2 channel mode	: 2Vrms ± 2dB
Channel unbalance (1kHz)	: <1dB
Crosstalk 1kHz	: >95dB
Crosstalk 20Hz-20kHz	: >85dB
Frequency response 20Hz- 20kHz	: ±0.2dB max
Signal to noise ratio	: >95 dB
Dynamic range 1kHz	: >85dB
Dynamic range 20Hz-20kHz	: >80dB
Distortion and noise 1kHz	: >85dB
Distortion and noise 20Hz-20kHz	: >75dB
Intermodulation distortion	: >77dB
Mute	: >95dB
Outband attenuation:	: >40dB above 30kHz

1.5.2 Scart Audio

Output voltage 2 channel mode	: 1.6Vrms ± 2dB
Channel unbalance (1kHz)	: <1dB

1.7 Digital Video Input (IEEE 1394)

1.7.1 Applicable Standards

Implementation according:
IEEE Std 1394-1995
IEC 61883 - Part 1
IEC 61883 - Part 2 SD-DVCR (02-01-1997)
Specification of consumer use digital VCR's using 6.3 mm magnetic tape - dec.1994
Mechanical connection according:
Annex A of 61883-1

1.8 P50 System Control

Via SCART pin nr 10

1.9 Dimensions and Weight

Height of feet	: 10mm
Apparatus tray closed	: WxDxH :435 x 324.5 x 88cm
Apparatus tray open	: WxDxH :435 x 366 x 88cm
Weight without packaging	: app. 4 kg ± 0.5 kg
Weight in packaging	: app. 6.5 kg

1.10 Laser Output Power & Wavelength

1.10.1 DVD

Output power during reading	: 0.8mW
Output power during writing	: 20mW
Wavelength	: 660nm

1.10.2 CD


Output power	: 0.3mW
Wavelength	: 780nm

2. Safety Information, General Notes

2.1 Safety Instructions

2.1.1 General Safety

Safety regulations require that during a repair:

- Connect the unit to the mains via an isolation transformer.
- Replace safety components, indicated by the symbol , only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that after a repair, you must return the unit in its original condition. Pay, in particular, attention to the following points:

- Route the wires/cables correctly, and fix them with the mounted cable clamps.
- Check the insulation of the mains lead for external damage.
- Check the electrical DC resistance between the mains plug and the secondary side:
 1. Unplug the mains cord, and connect a wire between the two pins of the mains plug.
 2. Set the mains switch to the 'on' position (keep the mains cord unplugged!).
 3. Measure the resistance value between the mains plug and the front panel, controls, and chassis bottom.
 4. Repair or correct unit when the resistance measurement is less than 1 MΩ.
 5. Verify this, before you return the unit to the customer/user (ref. UL-standard no. 1492).
 6. Switch the unit 'off', and remove the wire between the two pins of the mains plug.

2.1.2 Laser Safety

This unit employs a laser. Only qualified service personnel may remove the cover, or attempt to service this device (due to possible eye injury).

Laser Device Unit

Type	: Semiconductor laser GaAlAs
Wavelength	: 650 nm (DVD) : 780 nm (VCD/CD)
Output Power	: 20 mW (DVD+RW writing) : 0.8 mW (DVD reading) : 0.3 mW (VCD/CD reading)
Beam divergence	: 60 degree

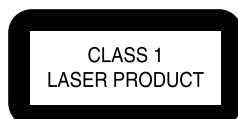



Figure 2-1

Note: Use of controls or adjustments or performance of procedure other than those specified herein, may result in hazardous radiation exposure. Avoid direct exposure to beam.

2.2 Warnings

2.2.1 General

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD, ) . Careless handling during repair can reduce life drastically. Make sure that, during repair, you are at the same potential as the mass of the set by a wristband with resistance. Keep components and tools at this same potential.

Available ESD protection equipment:

- Complete kit ESD3 (small tablemat, wristband, connection box, extension cable and earth cable) 4822 310 10671.
- Wristband tester 4822 344 13999.
- Be careful during measurements in the live voltage section. The primary side of the power supply (pos. 1005), including the heatsink, carries live mains voltage when you connect the player to the mains (even when the player is 'off!'). It is possible to touch copper tracks and/or components in this unshielded primary area, when you service the player. Service personnel must take precautions to prevent touching this area or components in this area. A 'lightning stroke' and a stripe-marked printing on the printed wiring board, indicate the primary side of the power supply.
- Never replace modules, or components, while the unit is 'on'.

2.2.2 Laser

- The use of optical instruments with this product, will increase eye hazard.
- Only qualified service personnel may remove the cover or attempt to service this device, due to possible eye injury.
- Repair handling should take place as much as possible with a disc loaded inside the player.
- Text below is placed inside the unit, on the laser cover shield:

CAUTION VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID EXPOSURE TO BEAM
 ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGÅ EKSPOSERING FOR STRÅLING
 ADVARSEL SYNLIG OCH OSYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGÅ EKSPOSERING FÖR STRÅLEN
 VAROJ AVATT AESSA OLET ALTTIINA NÄKYVÄLLE JA NÄKYMÄTTÖMÄLLE LASER SÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN
 VORSICHT SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET NICHT DEM STRAHL AUSSETZEN
 DANGEROUS VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID DIRECT EXPOSURE TO BEAM
 ATTENTION RAYON NIMEMENT LASER VISIBLE ET INVISIBLE EN CAS D'OUVERTURE EXPOSITION DANGEREUSE AU FAISCEAU

Figure 2-2

2.2.3 Notes

Dolby

Manufactured under licence from Dolby Laboratories. "Dolby", "Pro Logic" and the double-D symbol are trademarks of Dolby Laboratories. Confidential Unpublished Works.
 ©1992-1997 Dolby Laboratories, Inc. All rights reserved.

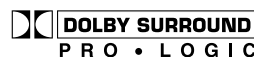


Figure 2-3

Trusurround

TRUSURROUND, SRS and symbol (fig 2-4) are trademarks of SRS Labs, Inc. TRUSURROUND technology is manufactured under licence from SRS labs, Inc.



Figure 2-4

Video Plus

“Video Plus+” and “PlusCode” are registered trademarks of the Gemstar Development Corporation. The “Video Plus+” system is manufactured under licence from the Gemstar Development Corporation.



Figure 2-5

Macrovision

This product incorporates copyright protection technology that is protected by method claims of certain U.S. patents and other intellectual property rights owned by Macrovision Corporation and other rights owners.

Use of this copyright protection technology must be authorized by Macrovision Corporation, and is intended for home and other limited viewing uses only unless otherwise authorized by Macrovision Corporation. Reverse engineering or disassembly is prohibited.

3. Directions For Use

◀◀

Select previous title/search backwards:
Briefly press the button during playback: Previous chapter/film or previous title
Hold down the button: Search backwards
Hold down the button during the still picture: slow motion backwards

▶▶

Select next title/search forwards:
Briefly press the button during playback: Next chapter/film or next title
Hold down the button: Search forwards
Hold down the button during the still picture: slow motion forward

■

STOP
Stop: Stop playback / recording, except with programmed recordings (TIMER)
Hold down the button to open and close the disc tray.

●

REC/OTR
Record: Record the current TV channel

EDIT
EDIT: For displaying the edit menu for DVD-R(W) discs, for setting chapter markers

TIMER
TIMER: To program a recording with ShowView® / without ShowView® or to alter/clear programmed recordings

Additional TV functions

TV VOLUME +

TV volume: Increase TV volume

TV VOLUME -

TV volume: Reduce TV volume

0.9

Number buttons: 0 - 9


CHANNEL +

TV programme number: To select a higher programme number

CHANNEL -

TV programme number: To select a lower programme number

Front of the device



STANDBY ON

Switch on or off: To switch off or on, interrupt a function, interrupt a programmed recording (TIMER)

CHANNEL -

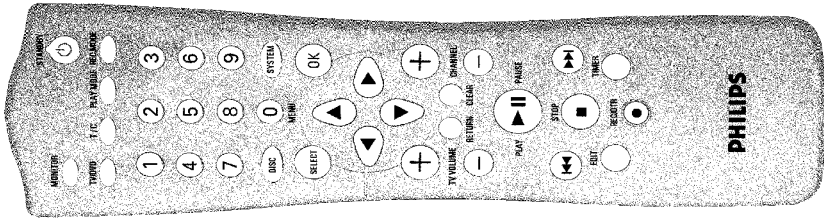
Select: Lower programme number

CHANNEL +

Select: Higher programme number

REC MODE

Record type (quality): To select the maximum possible record time



The remote control

MONITOR

Monitor: This button lets you switch between the (internal) TV tuner in the DVD recorder (TV picture on the TV set) and playback on the DVD recorder


STANDBY

Switch on or off: To switch set on or off, interrupt menu function, interrupt a programmed recording (TIMER)

TV/DVD

TV/DVD switch: Switches the start socket: EXT 2 AUX I/O directly to the TV set. This lets you watch the picture from any unit connected to the start socket (set-top box, video recorder or satellite receiver) and at the same time record from another source.
If you have not connected a device to start socket: EXT 2 AUX I/O you can use this button to switch between TV reception and DVD recorder.
This, however, functions only if you have connected your TV set to the DVD recorder using a start cable (socket: EXT 1 TO TV-I/O) and your TV set reacts to the switching.

T/C

Title/Chapter: Choose the T (Title)/C (Chapter) directly from the menu bar
If  appears in the display, the index menu from a recorded disc or an introductory film will be shown. In this case, this function is not available.

PLAY MODE

Playback type: Choose between repeat, shuffle play and intro-scan

REC. MODE

Record type (quality): To select the maximum possible record time

0.9

Number buttons: 0 - 9

DISC-MENU

Disc menu: To show the DVD menu or the index screen

SYSTEM-MENU

System menu: Call up/cancel the main menu (menu bar at the top of the screen)

SELECT

Select: Select function/value

OK

Store/confirm: To store or confirm entry

◀ ▶ ▲ ▼

Cursor keys: Left, right, up, down

RETURN

Back: Return to previous menu on a video CD (VCD). This function works also on some DVD's.

CLEAR

Delete: To delete last entry or clear programmed recording (TIMER)

CHANNEL +

Plus: Next programme number

CHANNEL -

Minus: Previous programme number

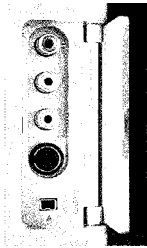
PLAY/PAUSE ▶||

Playback/pause: Play back a disc.
If this button is pressed during playback, the DVD recorder switches to pause. You will see a still picture.
If this button is pressed during recording, the DVD recorder will also switch to pause.

RECORD	Record: Record the current TV channel
RECORD LED	Recording in progress: Red light on the RECORD button to indicate recording in progress
OPEN/CLOSE	Open/close disc tray
⏮	Select previous title/search backwards
⏪	Select next title/search forwards
■ STOP	Stop: Interrupt playback/recording
▶ PLAY/PAUSE	Playback/pause: Play back recorded disc, interrupt playback, still picture

ENGLISH

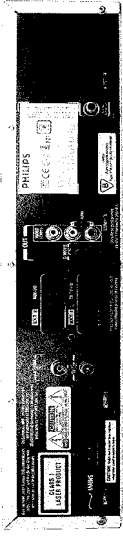
Behind the flap at the left-hand corner on the front



DV	i-Link / DV socket (digital video input, IEEE 1394, FireWire): Connecting a digital camcorder or other suitable device (programme number 170117).
S-VIDEO	S-Video socket: Connection of SVHS/Hi8 camcorders or SVHS/Hi8 video recorders (programme number 170117)
Yellow socket VIDEO	Video input socket: Connection of camcorders or video recorders (programme number 170117)
White/red socket left AUDIO right	Audio input socket left/right: Connection of camcorders or video recorders (programme number 170117)

Switching between sockets IN S-VIDEO (Y/C) and IN VIDEO (CVBS) is done automatically. In case both sockets are used, the signal received at socket IN S-VIDEO (Y/C) is treated with priority.

Back of the unit



~ MAINS	Mains socket: Connection to the mains supply (230V/50Hz)
ANTENNA	Aerial input: Connection of the aerial
TV	Aerial output: Connection of the TV set
EXT 2 AUX I/O	Start socket 2: Connection of an additional device (satellite receiver, set-top box, video recorder, camcorder, etc.)

EXT 1 TO TV-I/O	Start socket 1: Connection of a TV set, RGB- output
OUT S-VIDEO (Y/C)	S-Video output: Connection of an S-Video compatible TV set
OUT VIDEO (CVBS)	Video output (yellow socket): Connection of a TV set with a video input (CVBS, Composite Video)
OUT L AUDIO R	Analogue audio output (white/red socket): Connection of a TV set with audio input sockets or connection of an additional device
DIGITAL AUDIO OUT	Digital audio output: Connection of a digital audio device (amplifier/receiver)

The symbols on your DVD recorder display

These symbols can light up on your DVD recorder display:

TITLE	Displays the title number selected/played (DVD)
TRACK	Displays the track selected/played (VCD/CD)
DVD-RW	Displays the inserted DVD disc: DVD /DVD-R / DVD-RW. Disc types 'DVD-R/DVD-RW' are shown as DVD.
S-VCD	Displays the CD-disc inserted: S-VCD/VCD/CD
EP + CHAPTER	Displays the recording type (Quality/Playback type)HQ, SP+, EP, EP+.
TOTAL TIME	Displays the chapter selected/played
REMAIN TIME	Total playback time Time remaining
TIME	Time used
DTS	A DTS audio signal is available on the digital audio output
DD DIGITAL	A Dolby digital audio signal is available on the digital audio output
MPEG	An MPEG audio signal is available on the digital audio output
PCM	A PCM audio signal is available on the digital audio output
CHANNEL	Channel/programme number
▶	Playback in progress
	Playback/record interrupted (Pause)
RECORD	Recording in progress
⌂	A satellite recording has been programmed.
o()	A remote control signal has been received
⌚	A recording (timer) has been programmed
DECODER	A decoder has been assigned to the current TV channel (programme)

EMPTY DISC The disc inserted is either new or has been completely erased (no recordings).

PROTECTED The disc is protected against recording.

MAX TITLE The maximum number of titles per disc has been reached. The maximum number of titles per disc is 48.

MAX CHAP The maximum number of chapters per title/disc has been reached. The maximum number of chapters per title is 99, and 124 per disc.

DISC FULL The disc is full. There is no space for new recordings

PAL DISC A disc with PAL recordings has been inserted. The machine is trying to record an NTSC signal. Insert a new disc or one that contains NTSC recordings.

NTSC DISC A disc with NTSC recordings has been inserted. The machine is trying to record a PAL signal. Insert a new disc or one that contains PAL recordings.

RECORDING An illegal action (e.g. OPEN/CLOSE button) was attempted during recording.

RESET TITLE Playback was started for an empty title or the following title is empty

DISC LOCK An attempt has been made to record during playback of a protected disc. This message appears if an attempt is made to insert a chapter marker (EDIT button).

DISC ERR An error occurred when the title was being written. If this error keeps occurring, please clean the disc or use a new one. You will find information on how to clean the disc in the next chapter in the section 'Cleaning the discs'.

DISC MARK An error occurred when writing the title. Recording was continued, the error was skipped

SETUP After the automatic channel search, the menu for time/date settings appears on the screen.

WRITE DISC During the automatic channel search, the TV channels found will be counted

UNDECKED It is not possible to close/open the disc tray.

SAFE RECO The new recording will be made at the end of all the other recordings (SAFE RECORD).

ERASE LINK The 'EasyLink' function is currently transferring information from the TV set.

VPS/PDC Video programming system / programme delivery control. A VPS or PDC code will be transmitted for the selected TV program

NICAM The DVD recorder has detected a Nicam audio signal.

STEREO During playback a HiFi/2 channel tone was detected or a HiFi/2 channel tone was received

Multi-function display/Text line

- Clock
- Disc title playing time
- OTI switch-off time
- Title name
- Display of programme number of TV channel(position/channel name/function.
- Display of informations, warnings.

ENGLISH

Messages in the DVD recorder display

The following messages may appear in your DVD recorder display

TV ON The DVD recorder is currently in the initial installation mode. Switch on your TV set and read section 'Installing your DVD recorder' in chapter 'Initial Installation'.

NO SIGNAL No input signal available (signal inadequate or unstable)

MENU The menu on the screen is active

OPENING Disc tray opening

TRAY OPEN Disc tray open

CLOSING Disc tray closing

READING Disc being read

MENU UPDT Once recording has been successfully completed the table of contents is created.

INIT MENU The menu structure is created after the first recording has been made on a new disc

COPY PROT You have tried to copy a copy-protected DVD/video cassette.

WAIT Please wait until this message disappears. The DVD recorder is busy performing a task.

NO DISC No disc has been inserted for recording. If a disc has been inserted, perhaps it cannot be read.

INFO Information on the inserted DVD is displayed on the screen

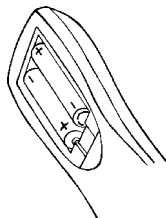
BUSY The DVD recorder is processing the changes to make them DVD compatible

ERASING The entire disc is erased

READING

THIS MESSAGE INDICATES THAT THE DVD RECORDER IS CURRENTLY READING THE DVD DISC. PLEASE WAIT UNTIL THIS MESSAGE DISAPPEARS.

Preparing the remote control for operation



The remote control and its batteries are packed separately in the original DVD recorder packaging. You must install the batteries in the remote control before use - described in the following section.

- 1 Take the remote control of the DVD recorder and the enclosed batteries (2 batteries).
- 2 Open the battery compartment, insert the batteries as shown and then close the battery compartment.

The remote control is now ready to use. Its range is approximately 5 to 10 meters.



Aim* correctly
In the following sections, you will need the remote control for the first time. Always point the front of the remote control at the DVD recorder and not at the TV set.

Tip

Connecting your DVD recorder to the TV set

The necessary cable connections must be made before you can record or playback TV programmes using your DVD recorder.

Connect the DVD recorder **directly** to your TV set. If there is a video recorder in between the picture quality may be poor because of the copy protection system built into the DVD recorder.
We recommend that you use a scart cable to connect your TV set and DVD recorder.



What is a scart cable?
The scart or Euro AV cable serves as the universal connector for picture, sound and control signals. With this type of connection, there is practically no loss of quality in picture or sound transmission.

When you install your DVD recorder for the first time, select one of the following options:

Connecting with a scart cable and Easy Link*
If your TV set is equipped with 'Easy Link, Cinema Link, NextView Link, Q-Link, Smart Link, Megalogic, Dialogic,...' and you wish to use a scart cable.



What is Easy Link?
If your TV set is equipped with functions such as Easy Link, Cinema Link, NextView Link, Q-Link, Smart Link, Megalogic or Dialogic, which are fully compatible with one another (TV set, DVD recorder, etc.), your DVD recorder can exchange information with your TV set. Please see your TV's operating instructions.

Connecting with a scart cable without Easy Link*
If your TV set is not equipped with 'Easy Link, Cinema Link, NextView Link, Q-Link, Smart Link, Megalogic, Dialogic,...' and you wish to use a scart cable.

Connecting with an S-Video (Y/C) cable*
If your TV set is equipped with an S-Video (YHS) socket.



What is an 'S-Video (Y/C) cable'?
This connecting cable, also known as the YHS cable, is used to transmit the brightness signal (Y signal) and colour signal (C signal) separately. This mini DIN socketplug is also called a Posidom socketplug.

Connecting with video (CVBS) cable*
If your TV set is equipped only with a video (CVBS) socket.



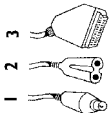
What is 'Video (CVBS)'?
This socket, usually referred to as the Cinch socket, is used for transmitting the composite video signal (BAS, CVBS). In this method of transmission the colour signal and the brightness signal are transmitted on the same cable. In certain circumstances, this can lead to problems with the picture, such as 'Moiré' patterns.

Connecting with a scart cable and 'Easy Link'



Your DVD recorder can exchange information with your TV set using 'Easy Link'. Your TV channels can also be transferred in the same order from your TV set to your DVD recorder using 'Easy Link'.

Have the following cables ready:
an aerial cable (1, supplied), a mains cable (2, supplied), a special scart cable (3, suitable for Easylink).

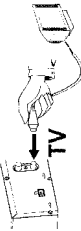


1 Switch off your TV set.

2 Remove the aerial cable plug from your TV set. Insert it into the ANTENNA socket at the back of the DVD recorder.



3 Insert one end of the supplied aerial cable into the TV socket at the back of the DVD recorder and the other end into the aerial input socket at the back of the TV set.

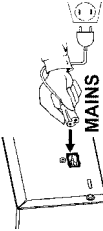


4 Plug a special scart cable (for Easylink) into the scart socket EXT 1 TO TV40 at the back of the DVD recorder and the corresponding scart socket at the back of the TV set (see TV set operating instructions).



5 Switch on the TV set.

6 Insert one end of the supplied mains cable into the mains socket ~MAINS at the back of the DVD recorder and the other end into the wall socket.



7 A message appears on the screen announcing that the transfer has started. 'EASY LINK' appears on the display during transfer. The TV set transfers all stored TV channels, in the same order, to the DVD recorder. This may take several minutes.



Connecting the DVD recorder

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Problem

"Time", "Year", "Month", "Date" appears on my TV screen for confirmation

Normally, the date and time are transferred from the data of the TV channel that is stored under programme PO1. If the aerial signal is too weak or disrupted, you must manually set the time and date.

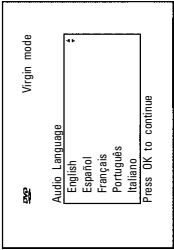

1 Check if the time in line **Time** is correct.

2 If required, change the time with the number buttons **0-9** on your remote control.

3 Select the next line with **▲** or **▼**.

4 Check the displayed settings for: **'Year', 'Month' and 'Date'**.

5 When all information is correct, save by pressing **OK**.



Problem

"I can see more installation menus on my TV set"

Not all the necessary data has been transferred. Please enter the settings by hand as follows. For more information on the various functions see Initial installation in installing your DVD recorder.

1 Select the desired audio language using **▼** or **▲** and confirm with **OK**.

2 Select the desired subtitle language with **▼** or **▲** and confirm with **OK**.

3 Select the desired picture format using **▼** or **▲**.

4.3 letterbox For a 4:3 TV set; cinema format (black bars above and below the picture)

4.3 panscan For a 4:3 TV set; full height format with the sides cut off


16:9 For a 16:9 TV set

4 Confirm with **OK**.

5 Select your country with **▼** or **▲**.

If your country does not appear, select **'Other'**.

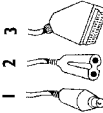
6 Confirm with **OK**.



Initial installation is now complete.

Connecting with a scart cable without 'Easy Link'

Have the following cables ready:
an aerial cable (1, supplied), a mains cable (2, supplied), a scart cable (3).



1 Remove the aerial cable plug from your TV set. Insert it into the ANTENNA socket at the back of the DVD recorder.

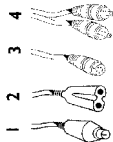


Connecting the DVD recorder

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Connecting with an S-Video(Y/C)cable

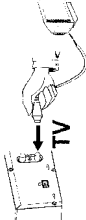
Have the following cables ready:
an aerial cable (1, supplied), a mains cable (2, supplied), an S-Video (SVHS) cable (3), an audio cable (4, supplied, red/white plug).



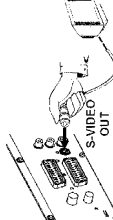
1 Remove the aerial cable plug from your TV set. Insert it into the ANTENNA socket at the back of the DVD recorder.



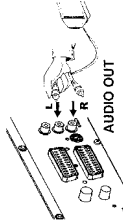
2 Insert one end of the supplied aerial cable into the TV socket at the back of the DVD recorder and the other end into the aerial input socket at the back of the TV set.



3 Insert one end of a S-Video (SVHS) cable into the OUT S-VIDEO (Y/C) socket at the back of the DVD recorder and the other end into the S-Video (SVHS) input socket on the TV set (usually labelled 'S-Video in' or 'SVHS in'. See TV operating instructions).

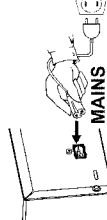


4 Insert one end of the supplied audio (Cinch) cable into the red/white Cinch socket OUT L AUDIO R at the back of the DVD recorder and the other end into the audio input socket (usually red/white) on the TV set (usually labelled 'Audio in' or 'AV in'. See TV operating instructions).



5 Switch on the TV set. Switch the TV set over to this input socket or select the relevant channel number. Please see your TV's operating instructions for the channel number you need.

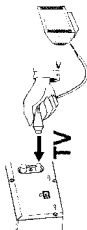
6 Insert one end of the supplied mains cable into the mains socket ~MAINS at the back of the DVD recorder and the other end into the wall socket. 'TV' or 'H' will appear on the display.



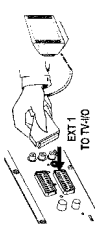
Then, read the paragraph on 'Initial installation' in 'Installing your DVD recorder'.

ENGLISH

2 Insert one end of the supplied aerial cable into the TV socket at the back of the DVD recorder and the other end into the aerial input socket at the back of the TV set.



3 Plug a scart cable into the scart socket EXT 1 TO TV-IO at the back of the DVD recorder and the scart socket for the DVD recorder at the back of the TV set (see TV set operating instructions).

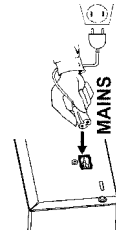


My TV set has several scart sockets. Which one should I use?
Select the scart socket that is suitable for both video output and for video input.
My TV set shows me a selection menu for the scart socket
Select 'VCR' as the source for this scart socket.

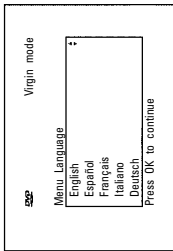


4 Switch on the TV set.

5 Insert one end of the supplied mains cable into the mains socket ~MAINS at the back of the DVD recorder and the other end into the wall socket. 'TV' or 'H' will appear on the display.



6 If the connection was properly made and your TV was automatically switched to the programme number for the scart socket, e.g. 'EXT 1', '0', 'AV', you will see the following picture:



My screen is empty.
✓ Many TV sets are switched by the DVD recorder to the programme number for the scart socket by way of a control signal sent through the scart cable.
✓ If the TV set does not automatically switch to the scart socket programme number, manually change to the corresponding programme number on your TV set (see your TV's operating instructions).
✓ Check that the scart cable is connected from the TV set to the EXT 1 TO TV-IO socket on the DVD recorder. The EXT 2 AUX IO socket is intended only for additional devices.

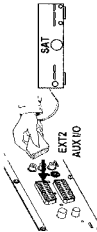


Then, read the paragraph on 'Initial installation' in 'Installing your DVD recorder'.

Connecting additional devices to the second scart socket

You can connect additional devices such as decoders, satellite receivers, camcorders, etc. to the EXT 2 AUX I/O socket. When playback is started on this additional device the DVD recorder automatically connects the EXT 2 AUX I/O scart socket with the EXT 1 TO TV-AUDIO scart socket. You will then see the picture from the additional device on your TV set, even if the DVD recorder is switched off.

The TV/DVD button on the remote control allows you to switch between playback through the EXT 2 AUX I/O scart socket and playback from the DVD recorder.



Connecting additional video recorders

You can connect a video recorder to the EXT 2 AUX I/O socket. If you have an SVHS video recorder you can additionally use the OUT S-VIDEO (Y/C) socket and the OUT L AUDIO R sockets.

Please note:
Most pre-recorded video cassettes and DVDs are copy-protected. If you try to copy them you will see the message **COPY PROTECT** on the DVD recorder's display.

When copying video cassettes the display on the DVD recorder shows "COPY PROTECT".

- ✓ Check that the scart cable is plugged in firmly.
- ✓ The DVD recorder may not be able to recognise the video input signal if this signal is poor or does not comply with relevant standards.

When I copy DVD video discs or pre-recorded video cassettes the picture is fuzzy and the brightness varies

- ✓ This happens if you try to copy DVDs or video cassettes that have been copy-protected. Even though the picture on the TV is fine the recording on a DVD-R(W) is faulty. This interference is unavoidable with copy-protected DVDs or video cassettes.

Problem

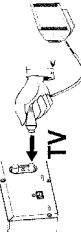
Connecting with video(CVBS) cable

Have the following cables ready:
an aerial cable (1, supplied), a mains cable (2, supplied), a video (CVBS) cable (3, supplied, yellow plug), an audio cable (4, supplied, red/white plug).

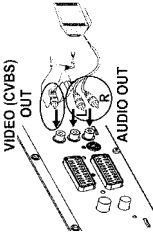
- 1 Remove the aerial cable plug from your TV set. Insert it into the ANTENNA socket at the back of the DVD recorder.



- 2 Insert one end of the supplied aerial cable into the TV socket at the back of the DVD recorder and the other end into the aerial input socket at the back of the TV set.



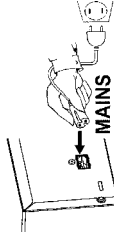
- 3 Insert one end of the supplied video (CVBS) cable into the yellow Cinch socket OUT VIDEO (CVBS) at the back of the DVD recorder and the other end into the video input socket (usually yellow) on the TV set (usually labelled 'Video in' or 'AV in'. See TV operating instructions).



- 4 Insert one end of the supplied audio (Cinch) cable into the red/white Cinch socket OUT L AUDIO R at the back of the DVD recorder and the other end into the audio input socket (usually red/white) on the TV set (usually labelled 'Audio in' or 'AV in'. See TV operating instructions).

- 5 Switch on the TV set. Switch the TV set over to the Video/Audio input socket or select the relevant programme number. Please see your TV's operating instructions for the programme number you need.

- 6 Insert one end of the supplied mains cable into the mains socket ~MAINS at the back of the DVD recorder and the other end into the wall socket. 'TV ON' will appear on the display.



Then, read the paragraph on 'Initial installation' in 'Installing your DVD recorder'.

Connecting audio devices to the front sockets

To copy camcorder recordings, you can use the front sockets. These sockets are located behind the flap on the left hand side.

Best Picture Quality

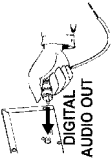
If you have a DV or Digital 8 camcorder, connect the **DV** input of the DVD recorder to the appropriate DV output on the camcorder.

Very good Picture Quality

If you have a Hi8 or S-VHS(C) camcorder, connect the **S-VIDEO** input of the DVD recorder to the appropriate S-VHS output on the camcorder.
You must also connect the audio input **left AUDIO right** on the DVD recorder to the audio output on the camcorder.

Good Picture Quality

If you have a camcorder that only has a single video output (Composite Video, CVBS), connect the **VIDEO** input on the DVD recorder to the appropriate output on the camcorder.
You must also connect the audio input **left AUDIO right** on the DVD recorder to the audio output on the camcorder.



DIGITAL AUDIO OUT

Connecting audio devices to the digital audio output socket


At the back of the DVD recorder there is a digital audio output socket **DIGITAL AUDIO OUT** for an coaxial cable.

These can be used to connect the following:

- an **A/V receiver** or an **A/V amplifier** with a **digital multi-channel sound decoder**
- a **receiver with two-channel digital stereo (PCM)**

Digital multi-channel sound ?


Digital multi-channel sound offers the best possible sound quality. You will need a multi-channel A/V receiver or amplifier that supports at least one of the audio formats of the DVD recorder (Dolby Digital and DTS). Consult the operating instructions for your receiver to find out which audio formats it supports.



Problem

✖All I can hear from my loudspeakers is a loud distorted noise

✓The receiver is not compatible with the digital audio format of the DVD recorder. The audio format of the DVD disc is displayed in the status window when you switch to another language. Playback in six-channel digital surround sound is only possible if the receiver has a digital multi-channel sound decoder.



Connect camcorder to the front sockets

To copy camcorder recordings, you can use the front sockets. These sockets are located behind the flap on the left hand side.

Best Picture Quality

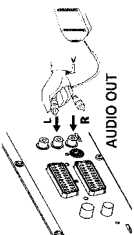
If you have a DV or Digital 8 camcorder, connect the **DV** input of the DVD recorder to the appropriate DV output on the camcorder.

Very good Picture Quality

If you have a Hi8 or S-VHS(C) camcorder, connect the **S-VIDEO** input of the DVD recorder to the appropriate S-VHS output on the camcorder.
You must also connect the audio input **left AUDIO right** on the DVD recorder to the audio output on the camcorder.

Good Picture Quality

If you have a camcorder that only has a single video output (Composite Video, CVBS), connect the **VIDEO** input on the DVD recorder to the appropriate output on the camcorder.
You must also connect the audio input **left AUDIO right** on the DVD recorder to the audio output on the camcorder.



AUDIO OUT

Connecting audio devices to the analogue audio sockets


Two analogue audio sockets **OUT L AUDIO R** (audio signal output left/right) are located at the back of the DVD recorder.

These can be used to connect the following:

- a **receiver with Dolby-Pro-Logic**
- a **receiver with two-channel analogue stereo**

Can I use the 'Phono' input on my amplifier?

This socket (input) on the amplifier is designed only for record players without preamplifiers. Do not use this input for connecting the DVD recorder.
The DVD recorder or the amplifier may be damaged as a result.



Connecting the DVD recorder

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Connecting the DVD recorder

3

Installing your DVD recorder

Initial installation

After successfully connecting your DVD recorder to the TV set and other additional devices as described in the previous chapter, this chapter will show you how to start the initial installation. The DVD recorder automatically seeks out and stores all available TV channels.

Aim correctly with the remote control

In the following sections, you will need the remote control for the first time.

Connecting additional devices

If you have connected additional devices such as a satellite receiver to the aerial cable, switch them on. The automatic channel search will recognise it and save it.

No aerial connected

Even if you only want to use the DVD recorder to play back or have only connected a satellite receiver, you must still complete the initial installation. This is necessary so that the basic settings are stored correctly. Once initial installation is complete you can use the DVD recorder as normal.

Tip

Aim the remote control at the DVD recorder and not at the TV set.

ENGLISH

1

Menu Language

English

Español

Français

Italiano

Deutsch

Press OK to continue

Virgin mode

:

2

Audio Language

English

Español

Français

Português

Italiano

Press OK to continue

Virgin mode

:

3

Subtitle Language

English

Español

Français

Português

Italiano

Press OK to continue

Virgin mode

:

4

Confirm with OK

5

Select the desired language for the subtitles by pressing ▼ or ▲

6

Confirm with OK

1

Select the desired language for the on-screen menu by pressing ▼ or ▲

2

Confirm with OK

3

Select the desired audio language using ▼ or ▲

4

Confirm with OK

5

Select the desired language for the subtitles by pressing ▼ or ▲

6

Confirm with OK

1

What is an on-screen menu?

The multi-language on-screen menu takes the mystery out of using your new DVD recorder. All settings and/or functions are displayed on your TV screen in the relevant language.

2

What is an audio language?

The DVD will play the sound in the language you select, provided this language is available on the disc. If it is not available on the disc the first language on the DVD will be used instead. The DVD Video Disc menu, if available, will also be displayed in the language you select.

3

What is the subtitle language?

The subtitles will be displayed in the language you select, provided this language is available on the disc. If it is not available on the disc the first language on the DVD will be used instead.

1

Which screen formats can I select?

4:3 letterbox for wide-screen (cinema format) with black borders at the top and bottom of the screen.
4:3 panscan for a full-height picture with cropped edges.
16:9 for a wide-screen TV set (screen edge ratio 16:9)

2

Confirm with OK

3

Select your country with ▼ or ▲

If your country does not appear, select 'Other'

4

Why do I have to set the country?

To call up the specific settings for the respective country, you must first install the country.

5

Confirm with OK

6

After you connect the aerial (or cable TV, satellite receiver, etc.) to the DVD recorder, press OK

The automatic TV channel search starts. 'HD 1' will appear on the display.

7

The DVD recorder cannot find any TV stations

Select channel 1 on the TV set. Can you see the stored TV channel on the TV set?
If not, check the cable connection from the aerial (aerial socket) to the DVD recorder and to the TV set.
Please have patience.
The DVD recorder searches the entire frequency range in order to find and store the largest possible number of TV channels. It is possible that the TV channels in your country are broadcast in a higher frequency range. As soon as this range is reached during the search, the DVD recorder will find the TV channels.
If no aerial is connected, complete the basic settings and then, if desired, start the automatic channel search (see section 'Automatic TV channel search').

8

When the automatic TV channel search is complete, 'Autom. search complete' will appear on the TV screen.

'Time', 'Year', 'Month', 'Date' will appear on the TV screen.

1

Installation

Autom. search

Searching for TV channels

00 Channels found

Bitte warten

2

Problem

When the automatic TV channel search is complete, 'Autom. search complete' will appear on the TV screen.

'Time', 'Year', 'Month', 'Date' will appear on the TV screen.

1

TV Stage

4:3 letterbox

4:3 panscan

16:9

Press OK to continue

2

Country

Austria

Belgium

Denmark

Finland

France

Press OK to continue

1

TV Stage

4:3 letterbox

4:3 panscan

16:9

Press OK to continue

2

Country

Austria

Belgium

Denmark

Finland

France

Press OK to continue

1

Installation

Autom. search

Searching for TV channels

00 Channels found

Bitte warten

2

Problem

When the automatic TV channel search is complete, 'Autom. search complete' will appear on the TV screen.

'Time', 'Year', 'Month', 'Date' will appear on the TV screen.

Installing your DVD recorder

21

22

Installing your DVD recorder

Auto Prog Sucl.

Autum search complete
00 Channel found

Time
Year 20:01
Month 01
Date 01

To continue
Press OK

- 13 Check if the time in 'Time' is correct.
- 14 If required, change the time with the number buttons 0.9 on your remote control.
- 15 Select the next line with ▲ or ▼ .
- 16 Check if the displayed settings for: 'Year', 'Month' and 'Date' are correct.
- 17 When all information is correct, save by pressing OK .

The initial installation is now complete.

Satellite receiver

If you are connecting a satellite receiver, please read the section on 'Using a satellite receiver'.

Decoder

If you are connecting a decoder, you must install it as described in the next section.

Tip

x Sound may be distorted on some TV channels.

✓ If the sound is distorted on any of the stored TV channels or if there is no sound at all, the wrong TV system may have been stored for the TV channel. Read 'Manual TV channel search' for information on how to change the TV system.

Problem

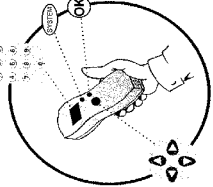
Using a satellite receiver

TV channels from a satellite receiver (connected to start socket EXT 2 AUX I/O) are received on the DVD recorder on programme number 'EXT2'

If necessary, use the MONITOR button to switch to the internal tuner.

Then select programme number 'EXT1' with 0 on the remote control and programme number 'EXT2' with CHANNEL— .

You should select the TV channels to be received by the satellite receiver directly on the receiver itself.



Allocating a decoder

Some TV channels send coded TV signals that can only be viewed properly with a purchased or rented decoder. You can connect such a decoder (describable) to your DVD recorder. The following function automatically activates the connected decoder for the TV channel you want to watch.

How do I allocate the decoder for Easy Link?

If your TC=V set supports 'Easy Link' the decoder must be assigned to the relevant TV channel on the TV set (see the operating instructions for your TV set). Settings cannot then be made in this menu.

?

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using STANDBY/ON .
- 3 Use the CHANNEL + and CHANNEL — buttons on the DVD recorder or the number buttons 0.9 on the remote control to select the TV channel for which you want to use the decoder. If necessary, use the MONITOR button to switch to the internal tuner.
- 4 Press the SYSTEM-MENU button on the remote control. The menu bar will appear at the top of the screen.
- 5 Select '1' using ◀ or ▶ .
- 6 Select line 'Installation' using ▼ or ▲ and confirm with ▶ .
- 7 Select line 'Manual search' using ▼ or ▲ and confirm with ▶ .
- 8 Select line 'Decoder' using ▼ or ▲ .
- 9 Select function 'On' with ◀ or ▶ .
- 10 Confirm with OK .
- 11 To end, press SYSTEM-MENU .

How can I switch the decoder off again?

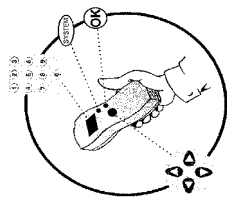
Select 'Off' (decoder off) on the TV screen in the line 'Decoder' using ▶ .

?

Your decoder has now been allocated to this TV channel. When this TV channel is selected, the 'DECODER' symbol will appear in the DVD recorder display.

Manual TV channel search

In some cases, not all of the available TV channels may have been found and stored during initial installation. In this case, you will need to search for and store the missing or coded TV channels manually.



ENGLISH



Tip

Manual search with EasyLink
With 'Easy Link', the DVD recorder will automatically download the TV channels stored on the TV set. This is why some lines have no function. To store new TV channels, they must first be stored on the TV set. The information will then be transferred to the DVD recorder automatically.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY/ON**.
- 3 Press **SYSTEM-MENU** on the remote control. The menu bar appears.
- 4 Select **TV** using **◀** or **▶**.
- 5 Select **'Installation'** using **▼** or **▲** and confirm with **▶**.
- 6 Select **'Manual search'** using **▼** or **▲** and confirm with **▶**.

Installation	
Manual search	
Channel/freq.	CH
Entry/search	01
Programme number	BBC1
TV channel name	01
Decoder	01
NICAM	01
NICAM	01
Fine tuning	0
To store	
Press OK	



In **'Channel/freq.'**, select the desired display using **▶**

What is hidden behind the settings?
'Freq.': Display/entry of frequencies
'CH': Display/entry of channels
'S-CH': Display/entry of special channels
What is a special channel?
TV signals are transmitted in certain pre-defined frequency ranges. These ranges are divided into channels. A specific frequency/channel is assigned to each TV station. Certain frequency ranges are specified as special channels (hyperband channels).



Problem

***I don't know the channel for my TV station**
✓ In this case, press **▶** to start the automatic search. A changing channel number/frequency number will appear on the TV screen. Continue the automatic search until you have found the TV channel you are looking for.

- 9 Using **◀** or **▶** in **'Programme number'**, select the programme number you want to use for the TV channel, e.g. **'01'**.



Tip

How can I change the displayed symbol of a TV channel?
1 In **'TV channel name'**, press **▶**.
2 Select the desired symbol position using **◀** or **▶**.
3 Change the symbol at the symbol position with **▼** or **▲**.
4 Select the next symbol position in the same way.
5 Keep pressing **▶** until the cursor disappears.

How can I change the TV system of the TV channel?

In **'TV system'**, use **◀** or **▶** to select the TV system that produces the least distortion of picture and sound.

What is NICAM?

NICAM is a digital sound transmission system. Using NICAM, you can transmit either 1 stereo channel or 2 separate mono channels. However, if reception is poor and the sound distorted you can turn off NICAM.

In **'NICAM'**, select **Off** using **◀** or **▶**.

How can I improve the automatic process for storing channels?

To change the automatic process for storing channels (fine tuning), select **'Fine tuning'**.
Using **◀** or **▶** you can try to fine-tune the TV channel manually.

Experts

- 10 Press **OK** to store the TV channel.
- 11 To search for other TV channels, begin again at 9.
- 12 To end, press **SYSTEM-MENU**.

Sorting TV channels automatically (Follow TV)

When the automatic channel search function is activated, the TV channels are stored in a specific order. This may differ from the order in which the TV channels appear on your TV set. This function changes the order of the TV channels stored in your DVD recorder to match the order on the TV set.

This only works if the DVD recorder (**EXT 1 TO TV-IO socket**) and the TV set are connected with a **scart cable**.



What does EASYLINK do?

If your TV set supports 'EasyLink...', TV channels will be stored during initial installation in the same order as they appear on the TV set. To store the TV channels in a different order, you'll need to change the order on the TV set. When you start the Follow TV function the information is transferred again from the TV set.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.

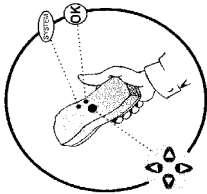
Automatic TV channel search

During installation, all available TV channels are searched for and stored. If the channel assignments of your cable or satellite TV provider change or if you are reinstalling the DVD recorder, e.g. after moving house, you can start this procedure again. This will replace the stored TV channels with the new ones.



What does Easy Link do?

With EasyLink, you can search for and store TV channels only on the TV set. These settings are accepted by the DVD recorder. Use this function to start the transfer of TV channels from the TV set.



- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY/ON**.
- 3 Press **SYSTEM-MENU** on the remote control. The menu bar will appear at the top of the screen.
- 4 Select **TV** using **◀** or **▶**.
- 5 Select line **Installation** using **▼** or **▲** and confirm with **▶**.
- 6 Select line **Autom. search** using **▼** or **▲**.
- 7 Press **▶**.

- 8 The automatic TV channel search starts. This allows the DVD recorder to save all available TV channels. This procedure may take several minutes.
- 9 When the automatic search is completed, **Autom. search complete** will appear on the TV screen.
- 10 To end, press **SYSTEM-MENU**.

You can read about how to search for a TV channel manually in section 'Adding and clearing TV channels manually'.

Installation
Autom. search
Searching for TV channels
00 Channels found
Bitte warten

ENGLISH

- 2 Switch on the DVD recorder using **STANDBY/ON**.
- 3 Press the **SYSTEM-MENU** button on the remote control. The menu bar appears.
- 4 Select **TV** using **◀** or **▶**.
- 5 Select **Installation** using **▼** or **▲** and confirm with **▶**.
- 6 Select **Follow TV** using **▼** or **▲** and confirm with **▶**.
- 7 Confirm the message on the screen with **OK**. **TV** **▶** will appear in the DVD recorder display.
- 8 Select programme number **1** on the TV set.

TV 1

x1 cannot switch my TV set to programme number '1'

✓ If you have connected additional devices to the **EXT 2 AUX I/O** socket, please disconnect these devices. Other connected devices may have switched the TV set to the programme number of the start socket.

- 9 Confirm with **OK** on the DVD recorder remote control. **TV** **1** will appear on the display. The DVD recorder compares the TV channels on the TV set and the DVD recorder. If the DVD recorder finds the same TV channel as on the TV set it stores it at '01'.

x1 will appear in the display. The DVD recorder is not receiving a video signal from the TV set.

✓ Check the connectors at both ends of the start cable.
✓ Check your TV's operating instructions to see which start socket is used for video signals.
✓ If the problem persists, you won't be able to use this feature. Please read 'Sorting and clearing TV channels manually'.

- 10 Wait until for example **TV** **02** appears in the display.
- 11 Select the next programme number on the TV set, e.g. **2**.
- 12 Confirm with **OK** on the DVD recorder remote control.

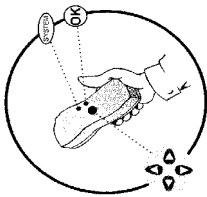
TV 02

Deleting sorting


You can delete incorrect TV channel sorting by pressing **◀**.

- 13 Repeat steps **10** to **12** until you have assigned all the TV channels.
- 14 To end, press **SYSTEM-MENU**.


Sorting and clearing TV channels manually



After you have performed the automatic channel search you may not agree with the sequence in which the individual TV channels have been allocated to the programme positions (programme numbers). You can use this function to rearrange the TV channels already stored or to delete TV channels you don't want or those with poor reception.


**Tip**

The teletext clock resets automatically
If you store a TV channel which transmits TXI/PDC on programme number 'P01', the date and time will automatically be transmitted and constantly updated. As a result, the changes from summer time to winter time and back again will be made automatically.

**What does Easy Link do?**

With EasyLink, TV channels can only be searched for and saved on the TV set. These settings are then accepted by the DVD recorder.
That is why you cannot select this function manually.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Turn on the DVD recorder. Press the **SYSTEM-MENU** button on the remote control. The menu bar will appear at the top of the screen.
- 3 Select **TV** using **◀** or **▶**.
- 4 Select line **'Installation'** using **▼** or **▲** and confirm with **▶**.
- 5 Select line **'Sort TV channels'** using **▼** or **▲** and confirm with **▶**.

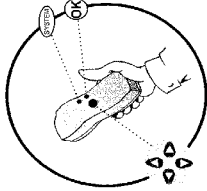
**Tip**

Deleting TV channels
Unwanted channels or those with poor reception can be deleted using **CLEAR**. After that you can continue at step **6**.

Installation
Sort TV channels
... P01 BBC1
P02 BBC2
P03 ITV
P04
P05
P06
...
To sort
Press **▶** To exit, press
SYSTEM MENU

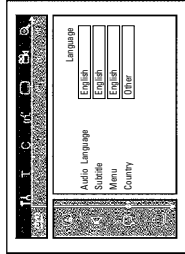
- 8 Using **▼** or **▲**, shift the TV channel to the desired position and press the **◀** button. The DVD recorder will insert the TV channel.
- 9 Repeat steps **6** to **8** until you have resorted/deleted all desired TV channels.
- 10 To save, press **OK**.
- 11 To end, press **SYSTEM-MENU**.


Setting the language/country



You can select the country and the subtitle language as well as the audio language for DVD playback. Please observe that with some DVDs, you can change the audio language and/or subtitle language only via the DVD disc menu. Moreover, you can set one of the displayed languages for the on-screen menu (OSD). However, the DVD recorder display will only display English text regardless of this setting.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY/ON**.
- 3 Press **SYSTEM-MENU** on the remote control. The menu bar appears.
- 4 Select the **TV** icon using **◀** or **▶**.
- 5 Select **'Language'** using **▼** or **▲** and confirm with **▶**.



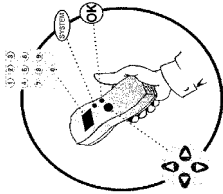
**Tip**

Which settings can I choose?
Audio Language: Playback language (audio language)
Subtitle: Subtitle language
Menu: Language of the OSD menu
Country: Location (country)

Select the appropriate line and confirm with **▶**.

- 6 Select the appropriate setting using **▼** or **▲** and confirm with **OK**.
- 8 To end, press **SYSTEM-MENU**.

Setting the time and date



If the display shows an incorrect time or "----", the time and date must be reset manually. If a TV channel which transmits TXTPDC (teletext/PDC) is stored under programme number "P01", the time and date will automatically be taken from the TXTPDC information.

ENGLISH

- 1 Press **SYSTEM-MENU** on the remote control. The menu bar appears.
- 2 Select the **"T1"** icon using **◀** or **▶**.
- 3 Select **'Installation'** using **▼** or **▲** and confirm with **▶**.
- 4 Select **'Time/Date'** using **▼** or **▲** and confirm with **▶**.
- 5 Check if the time in **'Time'** is correct. If required, change the time with the number buttons **0..9** on your remote control.
- 6 Check **'Year'**, **'Month'** and **'Date'** in the same way. To move between the fields, use **▼** or **▲**.
- 7 Check the displayed settings and confirm with **OK**. **'Stored'** will appear briefly on the screen.
- 8 To end, press **SYSTEM-MENU**.

Installation	
Time/Date	
Time	20:00
Year	2002
Month	01
Date	01

To exit, press
SYSTEM MENU

You can check and change many of the features and settings on your DVD recorder using the system menu. The menu bar cannot be displayed during recording.

Icons in the menu bar

Use the **SYSTEM-MENU** button to call up and close the menu bar (main menu). You can select the appropriate feature using **◀** and **▶**. You confirm a feature using **▼**. This takes you to a submenu or executes the feature immediately. Depending on the current disc, some features may not be available.

Menu bar 1



T1	User preferences
T	Title/Track
C	Chapter/Index
(i)	Audio language
(s)	Subtitle language
(k)	Camera angle
(z)	Zoom

Menu bar 2















To display menu bar 2, press **▶** while menu bar 1 is displayed.

(s)	Sound
(f)	Frame-by-frame playback
(s)	Slow motion
(f)	Fast motion
(t)	Search by time

Temporary feedback icons







Temporary feedback icons appear in the top left-hand corner of the menu bar with information on the different operating modes. This information appears briefly when certain disc features are activated :

	Shuffle: Shuffle play
	Scan
	Repeat entire disc
	Repeat title
	Repeat track
	Repeat chapter
	Repeat from A to end
	Repeat from A to B
	Camera angle
	Child lock active
	Auto resume
	Action not allowed









Status box

The status box displays the current operating mode (status) of the DVD recorder and the current disc type. This display can be switched off.

Disc type icons

	DVD+RW
	DVD+R
	DVD video
	Video CD
	No disc
	Error

Operating mode icons

	Record
	Stop
	Play
	Pause play
	Record pause
	Search forwards (8x speed)
	Search backwards (8x speed)
	Slow motion





Tuner info box

This box appears in the lower left-hand corner of the screen. The aerial signal, the TV channel and name of the TV channel are shown.

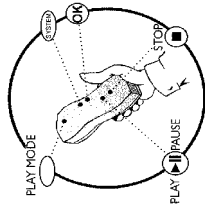
	Current channel
	Selected input socket
	No signal
	TV channel is not available
	Additional device is not connected or is switched off
	Copy-protected signal

Timer information box

This box appears above the tuner information box. When a timer recording is set, it shows the timer icon and the start time or date of the first programme to be recorded. If no timer recording is scheduled, the current time is displayed. This box disappears during playback of a disc or after a recording starts.

	Timer starts on the day shown
	OTR recording runs until the stop time displayed
	Current time
	No timer event programmed

5 Playback



Playback hints

This DVD recorder will play the following systems:

- DVD video
- (Super)Video-CD disc
- DVD+RW disc
- DVD+R Disc
- DVD-RW (videomode, finalised)
- DVD-R
- CD-R
- CD-RW
- Audio CD
- MP3-CD

You can operate the DVD recorder using the remote control or the buttons on the front of the DVD recorder.

Inserting a disc



- 1 Press the **OPEN/CLOSE** button on the front. The disc tray opens. The dialog box shows **OPENING** and then **TOP OPEN**.

- 2 Insert the disc carefully into the tray, with the label uppermost and press **PLAY/PAUSE** or **OPEN/CLOSE**. The dialog box shows **CLOSING** and then **READING**. The information on the disc is read.

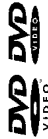
How do I insert a double-sided DVD?

Double-sided discs are not printed on either side. The labelling is in the centre on each side of the disc. The labelling of the side you wish to play must be uppermost.

Opening/closing the tray using the remote control

You can open and close the disc tray using the remote control. Press and hold the **STOP** button on the remote control until the dialog box shows **OPENING** or **CLOSING**.

- 3 Playback begins automatically.



A menu may appear during playback of a DVD. In case titles and chapters are numbered, press a number button on the remote control. You can also select a menu item using **◀**, **▶**, **▲**, **▼** and confirm with **OK**. For further information, read chapter 'Playing a DVD video disc'.



During the playback of a DVD+RW, the index screen overview appears. Choose the title you want to play back using **◀**, **▶**, **▲**, **▼**, **◀▶**, **▶▶**. Confirm with **OK**.

For further information, read chapter 'Playing a DVD+RW/+R disc'.



If the playback does not start automatically, press **PLAY/PAUSE** or **▶▶**. For further information, read chapter 'Playing an audio CD'.



If the **■** symbol appears in the display, start playback by pressing **PLAY/PAUSE** or **▶▶**. If a menu appears on the screen, use the remote control buttons indicated on the screen to select the menu option you want (**PREV**=**◀◀**, **NEXT**=**▶▶**) or with the number buttons **0-9**. For further information see 'Playing a (Super) Video CD'.

Playing a DVD video disc

x The 'H' will appear on the display

- ✓ The child lock was activated for the inserted disc. Read section 'Access control' and 'Authorising a disc' and in chapter 'Access control (child lock)'.

x The menu on the screen is showing an 'X'

- ✓ Some DVD discs can be manufactured so that certain steps are required before the disc can be played, or so that only limited operation is possible during playback. When an 'X' appears on the screen the selected feature is not possible.

x The screen is showing regional code information

- ✓ Since DVD films are not normally released in all parts of the world at the same time, all DVD players have a specific regional code. Discs can be given a regional code. If the regional codes differ between the player and the disc, playback is not possible.

- ✓ The regional code is shown on the label on the back of the machine.

- ✓ The regional code does not apply to recordable DVD discs.

x The screen is prompting me to choose an option from the menu.

- ✓ Select the option you want using **▲**, **▼**, **◀**, **▶** or the number keys **0-9**.

- In some cases you need to confirm with **OK**.

You can also access the menu using **DISC-MENU** on the remote control.



Problem



Tip

How can I access hidden information?

- 1 Press the **DISC-MENU** button on the remote control. A menu will appear on the screen. For some feature films this may appear after an introductory sequence.
- 2 Select the option you want using **▲**, **▼**, **◀**, **▶** or the number keys **0-9**. Confirm with **OK**.



- 1

If playback does not start automatically, press **PLAY/PAUSE** .
The display shows:
title, chapter, time elapsed.
- 2

To stop the disc, press **STOP** on the remote control or **■STOP** on the DVD recorder.
- 3

To eject the disc, press **OPEN/CLOSE** on the front of the DVD recorder.

Playing a DVD+RW/+R disc

- 1

If the disc is write-protected or a finalised DVD+R disc, playback starts automatically.



- 2

If playback does not start automatically, select the title you want to watch from the Index Picture Screen using **▼** or **▲** .
You can also use the **◀◀** or **▶▶** buttons on the front of the set.
Press **PLAY/PAUSE** **▶ II** .
The display shows:
title number, recording quality.
- 3

Press **PLAY/PAUSE** **▶ II** .
The display shows:
title number, recording quality.

Problem
X I see the message "COPY PROTECT" in the display
✓ There are no recordings on this disc.

- 4

To stop the disc, press **STOP** on the remote control or **■STOP** on the DVD recorder.
- 5

To eject the disc, press **OPEN/CLOSE** on the front of the DVD recorder.

What should I note when playing back different recording types (qualities)?
The correct recording quality 'HQ(H)', 'SP+(SP+)', 'EP(EP)', 'BP+(BP+)' will automatically be selected during playback.
For more information, please read section 'Selecting the recording type (Quality)' in chapter 'Manual recording'.

Playing an audio CD

You can use your DVD recorder to play audio CDs

- 1

Insert an audio CD. Playback starts automatically.

Audio CD display

If the TV is on, the audio CD screen appears automatically
During play, the current track number and its elapsed playing time will show on the TV screen and on the recorder display.



Tip

- 2

Stop playback using **STOP** . The number of tracks and the total time are displayed.

Playing an MP3 CD

MP3 (MPEG1 Audio Layer-3) files are highly compressed music files. Using this technology the data volume can be compressed by a factor of 10. This means it is possible to record 10 hours of music in CD quality on a single CD-ROM.

When creating MP3 CDs please note the following:

Supported file system: ISO9660, Joliet
Supported formats: *.mp3
File names: maximum 64 ASCII characters (joliet)
Maximum of 99 albums, 999 tracks
Supported sampling frequencies: 44.1kHz, 48kHz. Files with lesser than 44.1kHz will be skipped.
Supported bit rates: 32, 64, 96, 128, 192, 256 (kbps)
ID3 Tag: Version 1, 1.1. If the version is higher, the directory name is used for the album and the filename for the track.

Important notes for playback:

In agreement with SDMI the digital audio output will not work during MP3 playback.
Only the first session of a multi-session CD will play back.

- 1

Insert an MP3 CD. Playback starts automatically.

MP3 CD display

If the TV is on, the MP3 CD screen appears automatically
During playback, the current track number and its elapsed playing time will show on the TV screen and on the recorder display.
During interrupted playback (**STOP**), the current track number will show on the TV screen and on the recorder display.
If available in the so-called ID tag, more information will be displayed on: album, track, and artist.




Tip

- 2

Stop playback using **STOP** . The number of albums will be shown in the display.

Additional playback features


Select the previous or next title with **◀◀** or **▶▶** .
Choose the previous or the next album using **▲** or **▼** .
You can also use the number buttons 0-9 on the remote control to enter the number of the album/track.
You can also use **T/C** to select titles and albums.
1 Press **T/C** and then select symbol **T** for album or **C** for title with **▶** or **◀** .
2 Select the number of the album/title with **▼** , **▲** or with the number buttons 0-9 on the remote control.
You can also use repeat functions (Button **PLAY MODE**).



Tip

Playing a (Super) Video CD

(Super) Video CDs may be equipped with PBC (Play Back Control). This means that special playback functions (menus) can be directly selected. The Video CD must be PBC-compatible (see 'PBC' is turned on by default).

- 1** Insert a (Super) Video CD and press **PLAY/PAUSE▶II** .
If the  symbol appears in the display, start playback by pressing **PLAY/PAUSE▶II** .

2 If a menu appears on the screen, use the remote control buttons indicated on the screen to select the menu option you want (PREV=◀◀ , NEXT=▶▶) or with the number buttons 0-9 .
If the PBC menu contains a title list the desired title can be chosen directly.

3 The **RETURN** button will take you back to the previous menu.

4 Stop playback using **STOP■** .

Changing to another title/chapter

If there is more than one title or chapter on the disc, follow the instructions to change to another title or chapter. If there are several chapters within the title, these will be shown. It is possible to select these titles using the menu bar.

- 1** During playback use the **▶▶** button to move to the next title/chapter. Pressing **◀◀** takes you to the start of the current title or chapter. Pressing **◀◀** twice takes you to the start of the previous title or chapter.

Using T/C (title/chapter)

- 1** Press **T/C** (title/chapter) and select the appropriate title using **▲** or **▼** .
Ensuring that the **T** (Title) icon is selected in the menu bar.

2 Using **T/C** you can select chapters within the title. Press **T/C** and select the **C** (Chapter) icon using **▶** .
Select the appropriate chapter using **▲** or **▼** .

Tip

Searching a disc

You can search the disc for a recording at 4x or 32x playback speed. Additional playback speeds are available via menu bar **▶II** .

- 1** During playback, press and hold **◀◀** (reverse) or **▶▶** (forwards) to switch to the search feature. You can switch between the playback speeds using **◀◀** / **▶▶** .

2 To continue playback press **PLAY/PAUSE▶II** twice at your chosen location.

*No sound

✓ The sound is switched off in search mode. This is not a fault in your machine.

Problem

Search function via menu bar

- 1** During playback press **SYSTEM-MENU** on the remote control. The menu bar will appear at the top of the screen.

2 Select the **▶▶** icon using **▶** or **◀** and confirm with **▼** .

3 Using **◀** or **▶** you can now select different speeds forwards or backwards.

4 If necessary hide the menu bar using **SYSTEM-MENU** .



5 To continue playback, press **PLAY/PAUSE▶II** .

Tip








- 1** During playback, press **PLAY/PAUSE** to stop the disc and display a still picture.

Frame-by-frame playback via menu bar








- 1 During the still picture press **SYSTEM-MENU** on the remote control. The menu bar will appear at the top of the screen.
- 2 Select the  icon using **►** and confirm with **▼** button.
- 3 Using **◀** or **▶** you can now scroll forward one frame at a time.
- 4 If necessary hide the menu bar using **SYSTEM-MENU**.
- 5 To continue playback, press **PLAY/PAUSE** .

Tip

Slow motion

- 1 During playback, press **PLAY/PAUSE**  on the remote control. Then hold down  or  to switch to slow motion.
- 2 You can choose between the various speeds using  or .

Slow motion over the menu bar


- 1 During playback, press **PLAY/PAUSE**  on the remote control and then press **SYSTEM-MENU**. The menu bar will appear at the top of the screen.
- 2 Select the  symbol using  or  and confirm with .
- 3 Using  or  you can now select various slow motion speeds backwards or forwards.
- 4 If necessary hide the menu bar using **SYSTEM-MENU**.

Tip

- 3** To continue playback, press **PLAY/PAUSE** **II** twice.

Search by time

Using this feature you can select where playback should start (select elapsed time).

- 1 During playback, press **SYSTEM-MENU** on the remote control. The menu bar will appear at the top of the screen.
- 2 Select the  symbol using **▶** or **◀** and confirm with **▼**. Playback is stopped and a box appears on the screen showing the elapsed time.
- 3 Enter the start time with the digit keys **0.9** from where playback should start.



xThe time entered will flash

✓ The selected title is shorter than the time entered. Enter a new time or end the function using **SYSTEM-MENU**.

- 5** Playback starts before the time entered.





Repeat/Shuffle play


You can mark entire sections or the whole disc for endless playback. Depending on the type of disc (DVD video, DVD+RW, video CD) you can select a chapter, title or the entire disc.

- 1 Select the desired chapter, title or the entire disc and start playback.
- 2 During playback, press **PLAY MODE**. By pressing **PLAY MODE** again you can choose from the following options:
 - repeat chapter – DVD only
 - repeat title/track
 - repeat entire disc (Video CD, Audio CD only)
 - Shuffle play
 - no repeat
- 3 To switch off the repeat, press **STOP** . You can also press **PLAY MODE** repeatedly until the icons disappear.

Repeat sequence (A-B)

You can repeat a certain sequence within a title/chapter. You have to mark the start and end of the desired sequence.

- 1 During playback, press at the start of the sequence **PLAY/PAUSE**  II. You see a still picture.
- 2 Press **PLAY MODE** until the  icon appears on the screen. This marks the start point. Press **PLAY/PAUSE** II to start playback.
- 3 At the desired end point, press **OK**.  appears on the TV screen. The disc will only play between the selected points.
- 4 To switch off the repeat, press **STOP** . You can also press **PLAY MODE** repeatedly until the icons disappear.

- 3 Select the required camera angle using ▼ or ▲ . You can also enter the number directly using the number buttons 0..9 .
- 4 After a short delay, playback changes to the new camera angle. The  icon remains displayed until multiple angles are no longer available.

Changing the audio language


Pre-recorded DVD videos often come with multiple audio languages. Playback uses the language you selected during initial installation. You can change the audio language of the current disc at any time. You can change the audio language either using the menu of the inserted disc (**DISC-MENU** button) or the menu bar (**SYSTEM-MENU** button). The audio languages for DVD playback in the two menus may be different.

- 1 During playback press **SYSTEM-MENU** and select the **1/4"** icon using **▲**.
- 2 Select the required audio language using **▼** or **▲**. You can also enter the number directly using the number buttons **0-9**.
- 3 Play continues in the new audio language.

Subtitles

Pre-recorded DVD videos often come with subtitles in several languages. Playback uses the language you selected during initial installation. You can change the subtitle language of the inserted disc at any time.

You can change the subtitle language either using the menu of the inserted disc (**DISC-MENU** button) or the menu bar (**SYSTEM-MENU** button). The subtitle languages in the menus may differ.

- 1 During playback press **SYSTEM-MENU** and select the  icon using **▲**.
- 2 Select the required subtitle language using **▼** or **▲**. You can also enter the number directly using the number buttons **0-9**. You can switch off subtitles again with **0** or by pressing **off**.
- 3 Playback continues in the new subtitle language.











Scan feature

This feature plays back the first 10 seconds of each chapter (DVD) or track (CD).

- 1 During playback, press **PLAY MODE**. Select $\frac{1}{2}$ or $\frac{1}{4}$ using **PLAY MODE**.
- 2 After 10 seconds the DVD recorder switches to the next chapter/index. To start playback at the corresponding chapter/index, press **STOP** ■ and then **PLAY/PAUSE** ▢ II.




Zoom feature

The Zoom feature allows you to enlarge the video image and pan through the enlarged image.

- 1 During playback, press **PLAY/PAUSE** . The DVD recorder switches to PAUSE. You will see a still picture.
- 2 Press **SYSTEM-MENU** and select the  icon using .
- 3 Select the required zoom factor using  or .
- 4 When '**press OK to pan**' appears on the screen, the zoom process is complete.
- 5 Press **OK**. Using , , ,  select the part of the image you wish to view.
- 6 Confirm with **OK**.
- 7 To stop the feature, press **PLAY/PAUSE**  and then **SYSTEM-MENU**.

Camera angle

If a DVD video contains sequences recorded from different camera angles you can change the camera angle for playback.

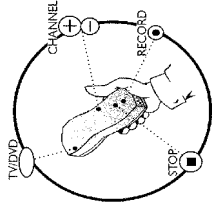
- 1 During playback, press **PLAY/PAUSE** . You will see a still picture.
- 2 Press **SYSTEM-MENU** and select the  icon using .




xThe '📷' icon is not visible

✓ The selected scene was not recorded from different camera angles. That is why you cannot select this feature. For more information please read the 'cover text' on your DVD video disc.

Problem



General information




Which discs can I use for recording?
With this DVD recorder, you can record on two types of DVD:
DVD-RW
This disc can be written to and then the contents deleted.
DVD+R
This type of disc can only be recorded once.
If you want to play this DVD in a DVD player it must be finalised using the 'Finalise disc' function. It is not possible to make further recordings using this disc.
If this disc is to be played in a DVD recorder it must not be finalised. Recordings can be added and deleted. The disc space (playback time) from the deleted recording cannot be recovered for further recordings.

Use the 'Manual recording' feature to spontaneously start recording (e.g. to record a TV show already in progress).

In the 'Index Picture screen' select the title to be overwritten or 'Empty title' using ▲.

If you want to record between existing recordings, check the length of the old recording and the length of the new recording. If the new recording is too long, the following recording (title/chapter) will be overwritten.



Insert new recordings at the end of all existing recordings (Safe Record)
To add a new recording at the end of the last recording on the disc, hold down the **REC/OTR** button until the message **SAFE-RECD** appears on the display.
For DVD+R discs each new recording is always added at the end of all previous recordings as existing recordings cannot be overwritten.

Tip
If you want to start and stop a recording manually, read 'Recording without automatic switch-off'.

If you want to start a recording manually but stop it automatically, read 'Recording with automatic switch-off'. (e.g. not to record to the end of the disc)

Read 'Automatic recording from a satellite receiver' if you want a recording to be controlled automatically by a satellite receiver.

Read 'Direct record' if you want to record a programme currently being shown.

ENGLISH

Recording without automatic switch-off


- 1** Switch on the TV set. If required, select the programme number for the DVD recorder.

2 Insert a disc to be used for the recording. The system and content of the disc will be checked. **RECORDING** will appear on the display.
- ✗ **Index display**
✓ A DVD+RW disc was inserted that already contains recordings. Use ▲ and ▼ to select a location where the recording should be started.
✗ **EMPTY DISC** appears in the display
✓ The inserted DVD disc is empty.

✗ **A dialog box appears asking if the contents should be erased or the disc should be ejected**
✓ The inserted disc is a DVD+RW disc whose contents are not compatible with DVD Video (e.g. a data disc). This disc cannot be used for recordings until the entire disc is erased using the **REC/OTR** button.

✗ **Too many titles** appears on the screen when a recording is attempted
✓ A disc can only contain a max. of 48 titles (including the empty titles). Erase the titles or change the disc.

Problem
- 3** If necessary, switch to the internal tuner on the DVD recorder using the **MONITOR** button on the remote control.

4 Select the programme number (station name) you wish to record using **CHANNEL +** or **CHANNEL -**. The following will appear on the display:
- 

Tip
If a TV station transmits a station name it will be shown in the display.
Programme number of the external inputs:
EXT 1 TO TV-I/O Start socket at the back
EXT 2 AUX I/O Start socket at the back
S-VIDEO / left AUDIO right S-VHS/Audio front sockets
AV VIDEO / left AUDIO right Video/audio front sockets
Switching between sockets S-VIDEO and VIDEO is done automatically. In case both sockets are used, the signal received at socket **S-VIDEO** is treated with priority.
Digital Video (Link) front socket DV



Recording with automatic switch-off (OTR) – One Touch Recording)

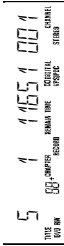
- 1 Insert a disc
 - 2 Use CHANNEL + or CHANNEL - to select the programme number (channel name) you want to record.
 - 3 Press REC/OTR on the remote control.
 - 4 Each time you press REC/OTR you will add 30 minutes to the recording time.
- How can I cancel the recording time I have just set?
To cancel the entry, press the CLEAR button while the recording time is displayed.

Protecting the disc against accidental recording

To prevent an important recording from being accidentally erased, you can protect the entire disc. You can only protect the disc as a whole. It is not possible to protect an individual recording.

- What happens with DVD-R discs?
As long as these discs are not finalised, they can be protected against accidental erasure in the same way as DVD+RW discs.
- 1 Insert the disc you wish to protect.
 - 2 Press DISC-MENU. The Index Picture Screen appears.
 - 3 While the Index Picture Screen is displayed, press the STOP button on the remote control. The first title is marked.
 - 4 Press . This takes you to the disc info screen.
 - 5 Press the button. Select 'Protection'. Confirm with .
 - 6 Select 'Protected' using and confirm with OK.
 - 7 Quit using and then DISC-MENU.

- 5 To start recording, press REC/OTR on the remote control or RECORD on the DVD recorder. If you want to start the recording at the end of the existing recordings, hold down the REC/OTR button until the message 'SAFE RECD' appears on the display.
For DVD+R discs each new recording is always added at the end of all previous recordings as existing recordings cannot be overwritten. On the display will appear e.g.:



Tip

Inserting chapter markers
During recording it is possible to mark scenes that you want to see or hide later.
During recording press EDIT at the relevant location. The screen displays 'Inserting marker'. The CHAPTER number is increased by one in the display box.
For more information on titles and chapters please see the section 'Changing to another title/chapter' in the chapter 'Playback'.

Problem

You can stop recording by pressing STOP on the remote control or ■STOP on the recorder. 'REW' 'PAUSE' will appear on the display. The DVD player is preparing the list of contents. Wait until this message disappears in the display, then the recording is completed.

*The display will read 'V/S/E ERR'
✓ The recording could not be completed correctly because of a disc error. Check and, if necessary, clean the inserted disc.

Tip

Making recordings on DVD+R discs compatible
If you want to play back the recording on a DVD player, you need to finalise the disc in the DVD recorder. You can prepare your DVD for use in a DVD player using the 'Finalising' feature. See the section 'Finalising DVD+R discs' in chapter 'Managing the disc contents'.

Interrupt recording (Pause)

- 1 During recording press PLAY/PAUSE II, for example to avoid recording the commercials.
 - 2 To continue recording, press REC/OTR.
- End recording
To end the recording, press the STOP button. Wait until 'REW' 'PAUSE' disappears from the display.

Selecting the recording mode (quality)

By selecting a recording mode, you define the picture quality of recordings and the maximum recording time for a disc.
You can check the quality by switching to a recording mode and then watch the picture via the builtin tuner (MONITOR button).
For playback, the correct picture quality will automatically be selected.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 On the front of the DVD recorder select the recording quality using REC MODE.
You can also use the button REC. MODE on the remote control.

Which recording types can I choose?

VHQ/HQ: HighQuality offers the best picture quality and a recording time of 60 minutes.

SP/SPA: StandardPlay (pre-recorded DVD quality) offers excellent picture quality with a recording time of 150 minutes.

EP/EP: ExtendedPlay (better than VHS quality). Recording time 240 minutes.

EP+EP+: 6 hours (VHS picture quality). Recording time 360 minutes.

Can I select the recording type via a menu as well?

1 Press the SYSTEM-MENU button.

2 Select the symbol with ◀ or ▶.


3 Select 'Record settings' using ◀ or ▶ and confirm with ▶.

4 In the line 'Rec Mode' select the recording type with ▼ or ▲.

5 Confirm using OK and SYSTEM-MENU.

6 If you have selected the recording type EP/EP or EP+EP+, you can select the settings 'Stand' (Standard) or 'Sport' (fast movements) in the 'Filter mode' line.

Tip



Automatic recording from a satellite receiver (Sat Recording)

You can use this feature if you own a satellite receiver that can control other devices via a scart cable and a programming feature (Timer). For more information, please see the operating instructions for the satellite receiver.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Press SYSTEM-MENU on the remote control. The menu bar appears.

The entire disc is now protected. If you try to record onto this disc the message 'Disc locked' will appear in the display and 'Disc locked' on the screen.


Lining up recordings within a title (assemble cut)

You can add further recordings to a title already contained on a DVD+RW disc. This recording will be added to the title as a so-called 'chapter'. Existing information will be overwritten from this location onward. Depending on the length of the recording, this will also overwrite titles that follow the current title. The recording mode (quality) is automatically transferred from the current title.
To play back this recording, press SYSTEM-MENU and select 'C' (chapter) using ▶. You can also use T/C.

For more information, read section 'Changing to a different title/chapter' in chapter 'Playback'.

What happens with DVD+R discs?

New recordings on DVD+R discs can only be added after existing recordings. It is not possible to overwrite existing recordings on DVD+R discs.



- 1 Find the title in the Index Picture Screen where you want to insert the new recording.
- 2 Look at the last minutes of the old recording (playback)
- 3 Press PLAY/PAUSE ▶ II on the remote control at the position where the new recording is to go. II will appear on the display.
- 4 To monitor the recording you can switch to the internal tuner using MONITOR.
- 5 Now start recording as usual by pressing REC/OTR ● on the remote control.
The new recording will be inserted.
- 6 Stop recording with STOP ■.

3

Select **PAUSE** using **◀** or **▶**.

4

Select line **'Record settings'** using **▼** or **▲** and confirm with **▶**.

5

Select **'Sat record'** using **▼** or **▲**.

6

Select **'EXT2'** with **◀** or **▶**.

7

Confirm with **OK**.

8

Use a start cable to connect the start socket **EXT 2 AUX I/O** on the DVD recorder to the corresponding start socket on the satellite receiver.

9

Quit using **SYSTEM-MENU**.

10

Insert a disc that you want to use for recording.

11

Programme the satellite receiver with the required information (programme number of the TV channel, start time, end time). If necessary, please see the operating instructions for your satellite receiver.

12

Switch off the DVD recorder with **STANDBY** **⏻**, **⏻** appears in the display to show the activated feature.

The DVD recorder is now ready to record. The beginning and end of the recording is controlled via the start socket: **EXT 2 AUX I/O**.

ENGLISH

Tip

Switching off 'Sat Recording'
To switch off the feature, select **Off** using **▶** or **◀**.

'Direct Record'

Can I instantly record the TV channel I want, even though the DVD recorder is switched off? No problem. If recording is started manually, the DVD recorder, when it is **switched off**, is set to the current TV channel on the TV set using the start cable. You will find more information on how to switch 'Direct record' on or off in the next section 'Direct Record'.

How does Direct Record work?
The DVD recorder uses the start cable to compare the TV channel selected on the TV set with its stored TV channels. If the same TV channel is found, the DVD recorder switches to the corresponding programme number and starts recording.
During this search please do not change the TV channel on the TV. This may affect the tuning of the DVD recorder.

1

On the TV set, select the programme number you want make the recording from.

2

Press **REC/OTR** with the DVD recorder **switched off**.

3

Stop recording with **STOP** **■**.

4

Select **'Direct Record'** using **▶** or **◀** and confirm with **▶**.

5

Select **'Record settings'** using **▼** or **▲** and confirm with **▶**.

6

Select **'Direct Record'** using **▼** or **▲**.

7

Select **'On'** (Direct Record on) or **Off** (Direct Record off) using **◀** or **▶**.

8

Confirm with **OK**.

9

Quit using **SYSTEM-MENU**.

10

Switch off with **STANDBY** **⏻**.

Problem

✓

'x' will appear on the display.
The DVD recorder is comparing its stored TV channels with those on the TV set. Please do not change the TV channel on the TV set while **'x'** is displayed.

✓

'x' appears in the display
This TV channel could not be found in the DVD recorder's memory. Check that all the TV channels stored on the TV set are available on the DVD recorder. If necessary, store any missing channels. Please read paragraph 'Manual TV channel search' in the chapter 'Installing your DVD Recorder'.

✓

Check the connectors at both ends of the start cable.

✓

Check your TV's operating instructions to see which start socket is used for video signals.

✓

If the problem persists, you won't be able to use this feature.

Switching 'Direct Record' on or off

1

Switch on the TV set. If required, select the programme number for the DVD recorder.

2

Press **SYSTEM-MENU** on the remote control. The menu bar appears.

3

Select **PAUSE** using **◀** or **▶**.

4

Select **'Record settings'** using **▼** or **▲** and confirm with **▶**.

5

Select **'Direct Record'** using **▼** or **▲**.

6

Select **'On'** (Direct Record on) or **Off** (Direct Record off) using **◀** or **▶**.

7

Confirm with **OK**.

8

Quit using **SYSTEM-MENU**.

9

Switch off with **STANDBY** **⏻**.

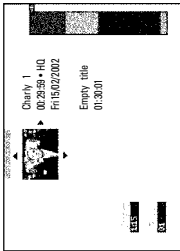
Manual recording

51

52

Manual recording

General Information

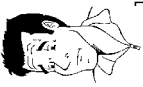


When a recording is made to disc, the following additional information is also stored at the beginning of the recording:

- Name of the recording
- If the TV station does not transmit a name, only the channel number and time will be stored as the name
- Length of the recording
- Record type (Quality)
- Date of the recording
- Index picture of the recording

A marker will be set every 5-6 minutes if the 'Auto chapters' function is activated in the 'Record settings' menu. This marker is known as a 'chapter'.

These markers can be changed when the recording has finished.



Can markers be set on a DVD-R disc?

Markers can be set on these discs if they have not been finalised.

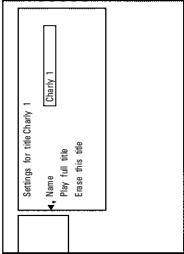
It is also possible to add 'chapters' later. This means that scenes you do not want to see during playback, such as commercials, can be hidden or skipped. During playback you can watch your recording as a continuous sequence without the hidden chapters.

- Read section 'Disc settings' to change general settings of the disc.
- Read 'Editing recording titles (name)' to find out how to change a name.
- Read 'Playing back titles' to find out how to play back the entire recording including the hidden chapters
- Read 'Erasing a recording/title' to find out how to erase titles and the accompanying recording.
- Read 'Favourite scene selection' to find out how to split the title into chapters and how to manage the chapters.

Editing recording titles (name)

Some TV stations transmit the title (name) of a programme. In this case, the name will be included automatically (e.g. 'ROCKY'). Otherwise, the channel number and time of the recording are stored as the name. The name of the recording can only be changed after the recording has been completed.

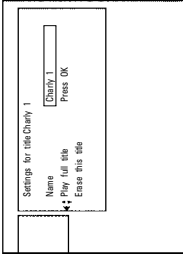
- 1 Press the **STOP** button or during playback press **DISC-MENU**.
- 2 Using **▲** or **▼** select the title whose name you want to edit and confirm with **▶**. The menu for editing names appears.
- 3 Select **Name** using **▲** or **▼** and confirm with **▶**.
- 4 Using **▶** or **◀** select the position where the letter/number/icon is to be changed/re-entered.
- 5 Change the icon using **▲** or **▼**. You can switch between upper and lowercase using **SELECT**. You can delete the character using **CLEAR**.
- 6 Repeat 4 and 5 until you have made the changes you want.
- 7 Save the new name with **OK**. 'Storing name' appears on the TV screen for confirmation.
- 8 To end, press **◀**.



Playing back titles

If you have hidden certain chapters of a title, with this setting you can view the entire title including the hidden chapters. Proceed as follows:

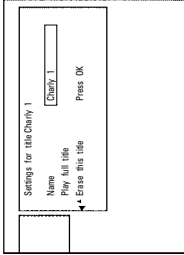
- 1 Press the **STOP** button or during playback press **DISC-MENU**.
- 2 Using **▲** or **▼** select the title that you want to play back and confirm with **▶**. The menu for editing titles appears.
- 3 Select **Play full title** using **▲** or **▼** and confirm with **OK**.
- 4 Playback begins automatically. The full title — including the hidden chapters — is played back.



Erasing a recording/title

You can erase individual recordings from a disc. Follow the instructions below:

- 1 Press the **STOP** button or during playback press **DISC-MENU**.
- 2 Using **▲** or **▼** select the title to be erased and confirm with **▶**. The menu for editing titles appears.
- 3 Using **▲** or **▼** select **Erase this title** and confirm with **OK**. The screen will show **This will completely erase this title. Press OK to confirm**.
- 4 If you want to erase the title press **OK**. To end, press **◀**.
- 5 The screen will show **Erasing title**.
- 6 **Empty title** will now appear in this position in the Index Picture Screen. A new recording can now be made at this position. If the deleted title was very short (shorter than 1 minute) no **Empty title** will be displayed.



Can titles be deleted from a DVD-R disc?

Titles on DVD-R discs are only marked as deleted. **Deleted title** will appear in the display instead of **Empty title**. During playback the 'deleted' title is skipped. The space used for this title cannot be used again as the title has not been physically deleted. Once the disc has been finalised no further changes can be made.

Disc settings

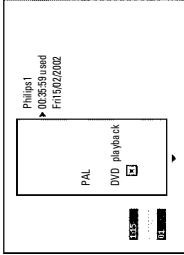
This screen appears before the first title and contains general information about the current disc.

You can:

-) change the name of the disc
-) activate or deactivate write protection on the disc
-) Finish editing (make edits DVD compatible)
-) Finalising DVD-Rs
-) Erasing DVD-RWs

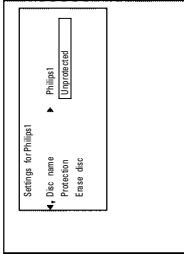
Follow the instructions to get to this screen:

- 1 Press the **STOP** button or during playback press **DISC-MENU**.
- 2 Select the first title using **▲** or press **STOP**.
- 3 Press the **▲** button. The Disc Info screen will appear.



Changing the disc name

- 1 In the Disc Info screen press **▶**. The **Settings for** menu appears on the TV screen.
- 2 Select **Disc name** using **▲** or **▼** and confirm with **▶**.
- 3 Using **▶** or **◀** select the position where the letter/number/icon is to be changed/re-entered.
- 4 Change the icon using **▲** or **▼**. You can switch between upper and lowercase using **SELECT**. You can delete the character using **CLEAR**.
- 5 Repeat **3** and **4** until you have made the changes you want.
- 6 Save the new title with **OK**. **Storing name** appears on the TV screen for confirmation.
- 7 To end, press **◀**.



Finalising a disc

Even if one or more titles have been edited, a DVD player may still show the original title. You can prepare your disc so that a DVD player will be able to read the edited title.

- 1 In the Disc Info screen press **▶**. The **Settings for** menu will appear on the screen.
- 2 Select **Make edits compatible** using **▲** or **▼** and confirm with **OK**.



* Make edits compatible does not appear

✓ Your disc is already compatible. No conversion is necessary.
To end, press **SYSTEM-MENU**.

Problem


- 3 The screen displays **This will take...** to show how long the process will last.

- 4 To confirm press **OK**. The screen will show **Working...**. A bar will move from left to right indicating the progress of the conversion.

Finalising DVD+R discs

This feature is required to play back a DVD+R disc in a DVD player. Once the disc has been finalised no further recordings or changes can be made.

- 1 In the Disc Info screen press **▶** . The **'Settings for'** menu appears on the TV screen.
- 2 Select **'Finalise disc'** using **▲** or **▼** , and confirm with **OK** .



Problem

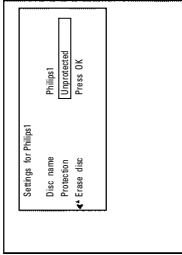
***'Finalise disc' does not appear**
✓ Either there is no DVD+R disc inserted or the disc is already finalised.
To end, press **SYSTEM-MENU** .

***'Settings for' does not appear**
✓ If the disc has been recorded on another DVD recorder, the menu may not appear. In this case, use the **'Finalise disc'** feature in the **TA** menu, under **Features** .

- 3 The screen displays **'This will take'** to show how long the process will last.
- 4 To confirm press **OK** . **'Working'** appears on the TV screen. A bar will move from left to right indicating progress.

Erasing DVD+RW disks

- 1 In the Disc Info screen press **▶** . The **'Settings for'** menu will appear on the screen.
- 2 Select **'Erase disc'** using the menu buttons **▲** or **▼** . Confirm with the menu button **OK** . The screen will show **'This will erase all titles Press OK to confirm'** .
- 3 If you want to erase all titles press **OK** . Otherwise press **◀** to end.
- 4 The screen will show **'Erasing disc'** .
- 5 Once the disc has been successfully erased the Index Picture Screen will show the empty area of the disc.



Favourite Scene Selection

In this menu, you can adjust a title to your personal preferences. You can insert/delete chapter markers, hide chapters, select a new index screen, or split the title. Display this menu during playback using **EDIT** on the remote control.

Inserting chapter markers

During playback you can set and erase chapter markers within a title. The maximum number of chapters per disc is 124 and 99 per title. If one of these numbers are reached, the following message appears: **'Too many chapters'**. Some markers must be erased before new markers can be added.

- 1 During playback press **EDIT** on the remote control at the appropriate position. The **'Favourite Scene Selection'** menu will appear on the screen.

- 2 Confirm **'Insert marker'** using **OK** . The screen displays **'Inserting marker'** .

***'X' will appear on the screen:**
This DVD is write-protected or the disc is a finalised DVD-R. Subsequent changes cannot be made.

- 3 To stop the feature, press **EDIT** .



Tip

Hiding chapters

By default all chapters are visible. Chapters (such as commercials) can be hidden during playback or made visible again. In editing mode, hidden chapters are shown greyed out.

- 1 During playback of the appropriate chapter press **EDIT** on the remote control. The **'Favourite Scene Selection'** menu will appear on the screen.

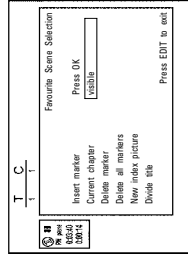
How do I select other chapters?

- 1 Press **'T/C'** on the remote control. The title and chapters are shown at the top of the screen.
- 2 Using **▶** or **◀** select Title(T) or Chapter (C).
- 3 Using **▲** or **▼** select the title or chapter you wish to edit.

- 2 Select **'Current chapter'** using **▼** .



Tip

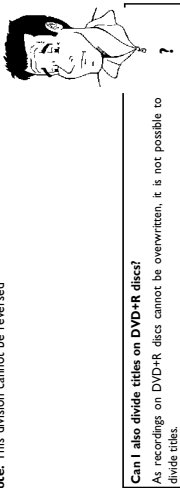


- 3 Select line 'New index picture' and confirm with **OK**.
 - 4 Start the change with **OK**. 'Updating menu' appears on the TV screen.
- Once the revision has been completed successfully the DVD recorder reverts to the index overview.

Dividing titles

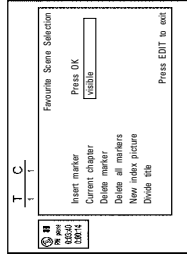
It is possible to divide a title into several separate parts (titles). Each of these parts (titles) is indicated by a separate index picture.

Please note: This division cannot be reversed



Can I also divide titles on DVD-R disc?
As recordings on DVD-R discs cannot be overwritten, it is not possible to divide titles.

- 1 During playback of the appropriate title press **EDIT** on the remote control. The 'Favourite Scene Selection' menu will appear on the screen



- 2 Select 'Divide title' and confirm with **OK**.
- 3 If you are sure, start the process by pressing **OK**. The screen will show 'Dividing title'.
- 4 Wait until the new title appears with an index picture in the Index Picture overview.

The title is now successfully divided.



Tip

- 3 Using **▶** select 'hidden'. The picture is shown darker.

Switching quickly

You can switch between show chapters (**Visible**) and hide chapters (**hidden**) quickly and easily using **SELECT**.

- 4 To end, press **EDIT**.

During playback this chapter will be skipped.
If the chapter is not visible, select 'visible' in step 3 with **▶**.

Erasing chapter markers

You can erase all or some of the markers within a title.

- 1 During playback of the appropriate chapter press **EDIT** on the remote control. The 'Favourite Scene Selection' menu will appear on the screen



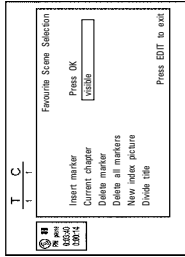
Tip

How do I select other chapters?

- 1 Press 'T/C' on the remote control. The title and chapters are shown at the top of the screen.
- 2 Using **▶** or **◀** select Title(T) or Chapter (C).
- 3 Using **▲** or **▼** select the title or chapter you wish to edit.

- 2 Using **▼** select 'Delete marker' for this chapter or 'Delete all markers' for all chapters within the selected title.

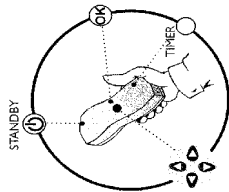
- 3 Confirm with **OK**.
- 4 To end, press **EDIT**.



Changing the index picture

Normally the first picture of a recording is used as the index picture. You can however choose any picture from the recording as the index picture.

- 1 During playback, search for location of the new index picture. Press the **PLAY/PAUSE▶II** button.
- 2 Press the **EDIT** button. The 'Favourite Scene Selection' menu appears on the TV screen.



General information

Use programmed recording (TIMER) to automatically start and stop a recording at a later date. The DVD recorder will switch to the right program number and begin recording at the correct time.

With this DVD recorder, you can pre-program up to 6 recordings within a period of one month.

To make a programmed recording, your DVD recorder needs to know:

- * the date you want to make the recording
- * the program number of the TV channel
- * the start and stop time of the recording
- * VPS or PDC on or off
- * the recording mode (**HQ/SP/L/EP***).

This information is saved in a TIMER block.

What is 'VPS/PDC'?

VPS (Video Programming System)/ PDC (Programme Delivery Control) are used to control the start and duration of TV channel recordings. If a TV programme starts earlier or ends later than was scheduled, the DVD recorder will still switch itself on and off and the correct times.

What do I need to know about 'VPS/PDC'?

Usually the start time is the same as the VPS or PDC time. But if your TV guide gives a VPS or PDC time which is different from the programme's start time (e.g. 20.15 (VPS/PDC 20.14)), you must enter the **VPS/PDC time 20.14** (exact to the minute of the start time).

If you want to programme a timer that is different from the VPS or PDC time, you must switch off VPS or PDC.

Only one TV programme on a TV channel can be controlled using 'VPS/PDC' at a time. If you want to record two or more TV programmes on a TV channel using 'VPS/PDC', you will need to programme these as two separate recordings.



ENGLISH

Programming a recording (with 'ShowView ®')

Thanks to this programming system, you no longer need to tediously enter the date, programme number, start and end times. All the information needed by the DVD recorder for programming is contained in the ShowView® - programming number. This 9-digit ShowView® - number is found in most TV listings magazine.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Press **TIMER** on the remote control.
The programming method last selected is marked.
- 3 Select **'ShowView programming'** using ▼ or ▲ and confirm with ►.

4 Enter the entire ShowView number. This number is up to 9 digits long and can be found next to the start time of the TV programme in your TV listings magazine.
e.g.: 5-312-4 or 5 312 4

If you make a mistake, you can clear it with **CLEAR**.

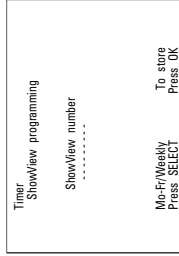


Tip

Selecting daily/weekly recordings

Using **SELECT**, select from the following options:
'Mo-Fr': Repeated daily recordings from Monday to Friday.
'Weekly': Repeated weekly recordings (every week on the same day).

Confirm with **OK**.



*The following message appears on the screen: 'Please enter programme number'

✓ The programme number of the TV channel has not yet been assigned to the ShowView number. Using ► and ◀ or the number buttons 0-9 on the remote control, select the corresponding programme number (name) of the TV channel and confirm with **OK**.

*The following message appears on the screen: 'ShowView number wrong'

✓ The ShowView number entered is incorrect. Correct your entry or cancel using the **SYSTEM-MENU** button.
✓ Check the time/date (see 'Setting the time and date' in 'Installing your DVD recorder'.

*The following message appears on the screen: 'Weekend programming not possible'


✓ A daily recording was entered for the wrong day. Daily programming can only be used for recordings to be made from Monday to Friday.



Problem

Timer
ShowView programming
Date Prog. Start: 2015
01
End: 21:30
Rec Mode SP+
Mo-Fri/Weekly
Press SELECT
To store
Press OK

ENGLISH



Tip

Switching on 'VPS/PDC' in the 'Start' input field
Select the 'Start' input field using **▶** . Using **SELECT** switch on 'VPS/PDC' ("*" lights up). If you press **SELECT** again, you will switch 'VPS/PDC' off ("*" disappears).

Changing the recording quality in the 'End' input field
Select the 'End' input field using **▶** . Using **SELECT** , select the recording mode **HQ, SP+, EP, EP+**.

1

Switch on the TV set. If required, select the programme number for the DVD recorder.

2

Press **TIMER** on the remote control.
The programming method last selected is marked.

3

Select **Timer programming** with **▼** or **▲** and confirm with **▶** .
The current information will appear on the screen.

4

Select the input field with **◀** or **▶** .

5

Enter information with **▼** or **▲** or with the number buttons **0-9** .

6

If all the information is correct, press **OK** . The programming information is stored in a **TIMER** block.

7

To end, press **TIMER** .

8

Load a DVD (unprotected) ready for recording.
The cassette is being checked.


9

Switch off with **STANDBY** **⏻** .
The programmed recording will only function properly if the DVD recorder has been **switched off** using the **STANDBY** **⏻** button.

If any of the **TIMER** blocks are in use, **⏻** will light up on the display.

Timer
Timer programming
Date Prog. Start: 2015
01
End: 21:30
Rec Mode HD
Mo-Fri/Weekly
Press SELECT
To store
Press OK

ENGLISH



Tip

Selecting daily/weekly recordings
In **Date** use **SELECT** to select from the following options:
'Mo-Fr': Repeated daily recordings from Monday to Friday
'Mo': Repeated weekly recordings (every week on the same day, e.g. Monday).
Programme numbers of start sockets 'EXT1' and 'EXT2'
You can also programme recordings from external sources via start socket **EXT 1 TO TV-IO (EXT1)** or **EXT 2 AUX IO (EXT2)**.
'Switching on 'VPS/PDC' in the 'Start' input field
Select the 'Start' input field using **TIMER** . Using **SELECT** switch on 'VPS/PDC' ("*" lights up). If you press **SELECT** again, you will switch 'VPS/PDC' off ("*" disappears).

Changing the recording quality in the 'End' input field
Select the 'End' input field using **TIMER** . Using **SELECT** , select the recording mode **HQ, SP+, EP, EP+**.

6

If all the information is correct, press **OK** . The programming information is stored in a **TIMER** block.

7

To end, press **TIMER** .

8

Load a DVD (unprotected) ready for recording.
The cassette is being checked.


9

Switch off with **STANDBY** **⏻** .
The programmed recording will only function properly if the DVD recorder has been **switched off** using the **STANDBY** **⏻** button.

If any of the **TIMER** blocks are in use, **⏻** will light up on the display.

Timer
ShowView programming
Date Prog. Start: 2015
01
End: 21:30
Rec Mode SP+
Mo-Fri/Weekly
Press SELECT
To store
Press OK

ENGLISH



Tip

Switching on 'VPS/PDC' in the 'Start' input field
Select the 'Start' input field using **▶** . Using **SELECT** switch on 'VPS/PDC' ("*" lights up). If you press **SELECT** again, you will switch 'VPS/PDC' off ("*" disappears).

Changing the recording quality in the 'End' input field
Select the 'End' input field using **▶** . Using **SELECT** , select the recording mode **HQ, SP+, EP, EP+**.

7

If all the information is correct, press the **OK** button. The programming information is stored in a **TIMER** block.

8

To end, press **TIMER** .

9

Load a DVD (unprotected) ready for recording.
The current disc is checked.

10

Switch off with **STANDBY** **⏻** .
The programmed recording will only function properly if the DVD recorder has been **switched off** using the **STANDBY** **⏻** button.

If any of the **TIMER** blocks are in use, **⏻** will light up on the display.

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Programming a recording (TIMER)

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63

Programming a recording (TIMER)

Problem solving for programmed recordings	
PROBLEM	SOLUTION
DVD recorder is not responding	✓While a programmed recording is being made, you cannot operate your recorder manually. If you want to cancel the programmed recording, press STANDBY .
'Switch off, timer recording' flashes on the TV screen.	✓The DVD recorder was switched on several minutes before the start of a programmed recording. Switch off the DVD recorder with STANDBY . A programmed recording (timer) will only function if the DVD recorder is switched off button STANDBY .
Error message: 'Insert recordable disc'	✓Either no disc has been inserted or you cannot record to this disc. Insert a disc that you can record onto. Switch off the DVD recorder using STANDBY .
The error message 'Disc locked' appears briefly on the screen.	✓A write-protected disc has been inserted. Cancel the protection (see 'Preventing accidental erasing of discs' in 'Manual Recording') or insert a different disc.
Error message: 'Memory full'	✓If this error message appears after pressing TIMER , then all the TIMER blocks are already programmed. No more recordings can be programmed. Press the ▶ button. If you want to clear or check a programmed recording (TIMER block), select it with CHANNEL + or CHANNEL - .
The 'Data error' message appears on the screen.	✓The data for the recording could not be transferred. Please check the date, start time and end time of the programmed recording.
'Collision' appears on the screen.	✓The information for two programmed recordings overlap. ✓If you ignore this error message the TV programme with the earlier start time will be recorded first. You will miss the start of the second programme. ✓Change the information for one of the recordings. ✓Delete one of the recordings

How to check, change or delete a programmed recording (TIMER)

1

Switch on the TV set. If required, select the programme number for the DVD recorder.

2

Press **TIMER** on the remote control.
The programming mode last selected is marked.

3

Select 'Timer List' with **▼** or **▲** . and confirm with **▶** .

4

Select the programmed recording (TIMER) you want to check, change or delete with **▼** or **▲** .

Timer List

Date	Prog.	Start	End	Rec
01		2015	21:30	SP
		--:--	--:--	--

Total record time:00:30

To change Press ,

To exit Press TIMER

5

Press **▶** .
Select the input field with **◀** or **▶** .
If required, change the information with **CHANNEL -** or the number buttons **0-9** .

6

Confirm with **OK** .

7

To end, press **TIMER** .

8

Switch off with **STANDBY** .

Delete programmed recording

1

Press the **CLEAR** button.


2

Confirm with **OK** . 'Timer Cleared' will briefly appear on the TV screen.
--:-- appears rather than the displayed values

3

To end, press **TIMER** .

Tip



Tip

'NexTVview Link'

This DVD recorder is equipped with the 'NexTVview Link' function. If your television is also equipped with this feature, you can mark TV programmes on the television for programming. These TV programmes will automatically be transmitted to a **TIMER** block on the DVD recorder. If you clear this marking on the television, the corresponding **TIMER** block on the DVD recorder will also be cleared.
For more information, read the instruction manual for your TV set.

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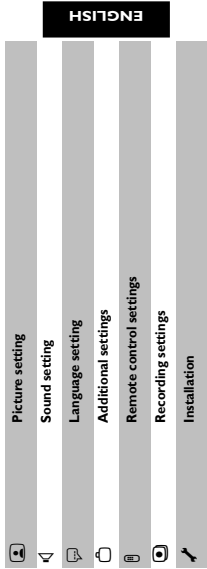
Programming a recording (TIMER)

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Programming a recording (TIMER)

10 User preferences

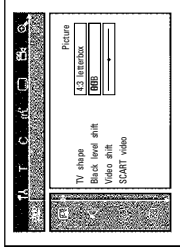
In this section you will learn how to set your user preferences on the DVD recorder. The symbols have the following meanings:



- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Press **SYSTEM-MENU** on the remote control. The menu bar appears.
- 3 Select the **TV** icon using **◀** or **▶** and confirm with **▶**.
- 4 Select the appropriate feature using **▼** or **▲** and confirm with **▶**.
- 5 Select the corresponding line using **▼** or **▲** and confirm with **▶**.
- 6 Select the appropriate feature using **▼** or **▲** or the setting using **◀** or **▶**.
- 7 Confirm the setting with **OK**.
- 8 Quit the menu item using **◀**.

Picture settings

You can choose the following features in this menu:



'TV shape'

The picture signal from your DVD Recorder can be set to match your TV screen:

- '4:3 letterbox': for a 'wide-screen' picture with black bars at the top and bottom
- '4:3 panscan': for a full-height picture with the sides trimmed
- '16:9': for a wide-screen TV set (screen edge ratio 16:9)

'Black level shift'

Adapts the colour dynamics for NTSC playback

'Video shift'

Use this feature to adjust the position of the picture on your TV left or right using **◀**, **▶** to suit your TV set.

'SCART video'

By default the recorder is set to '**RGB**'. Select '**S-Video**' if you want to connect an S-VHS recorder.

Sound settings

Depending on which audio outputs are used, you can select the settings in this menu. If you only use the analogue audio output (**OUT L AUDIO R**), select the settings '**Off**' in the '**Digital output**' menu.

'Digital output'

For devices connected to the **DIGITAL AUDIO OUT** socket, you can select from the following settings.

'**All**': Dolby Digital and DTS signals are fed unaltered to the digital output. **MPEG-2** multi-channel signals are converted to **PCM** (Pulse Code Modulation).

For receivers/amplifiers with **digital multi-channel sound decoders**.

'**PCM only**': Dolby Digital and MPEG-2 multi-channel signals are converted to **PCM** (Pulse Code Modulation).
For receivers/amplifiers without **digital multi-channel sound decoders**.

'**Off**': Digital output switched off.

For devices with **analogue audio input**.

'Analogue output'

For devices connected to the analogue audio output (**OUT L AUDIO R**), you can select from the following settings.

'**Stereo**': For devices without DolbySurround or TruSurround. Use this setting if the DVD recorder is only connected to a stereo TV set.

'**Surround**': Dolby Digital and MPEG-2 multi-channel are mixed down to a **DOLBY** surround-compatible two-channel output signal. For recorders with **Dolby Surround Pro Logic decoder**.


'**3D sound**': The six channels of the digital surround sound (Dolby Digital, MPEG-2) are mixed down to a two-speaker output signal. All original audio information is retained. The result is an impression of being surrounded by several loudspeakers.
For TruSurround compatible devices.

'Night mode'

Night mode optimises the sound for playback at low volume. You are therefore less likely to disturb your neighbours. This only works for Dolby Digital audio on DVD video discs.

Low power standby

To save power, you can switch off the clock display on the DVD recorder. Programmed (TIMER) recordings will still take place.

'On': If the DVD-Recorder is switched off (button **STANDBY** ) , the clock display is also switched off.

'Off': If the DVD-Recorder is switched off (button **STANDBY** ) , the clock display is visible.

'PBC'

This line appears only if a VCD is loaded.
This function lets you activate or deactivate the PBC menu (Playback Control) for video CDs.
See 'Playing a (Super) Video CD'.

Remote Control settings

In this menu you can set the remote control type to which your DVD recorder should respond to.

'DVD player': The DVD recorder responds to a DVD player remote control.
The DVD recorder also responds to the remote control of a DVD player (remote control code RC-6). Choose this setting if your Philips TV remote supports DVD functions.

'DVD recorder': The DVD recorder only responds to the supplied remote control.

Language settings

You can choose the following settings in this menu:

ENGLISH

Language

English

English

Audio Language

English

Subtitle

English

Menu

English

Country

Other

'Audio Language'

Playback audio language

Audio Language

'Subtitle'

Subtitle language

Subtitle language

'Menu'

Screen menu language

Screen menu language

'Country'

'Country'

'Country'

Additional settings

You can select the following functions in this menu:

Access control

Enter code...

On

Status box

On

Auto resume

On

Low power standby

Off

Please read the next chapter 'Access control' (child lock)'

Along with the on screen menu, the OSD (On Screen Display) also displays information on the current operating status (counter, playback, recording, TV channel, etc.) on the TV screen. You can switch off the information about the operating status to avoid recording it when recording from additional devices.

'Access control'

Please read the next chapter 'Access control' (child lock)'


'Status box'

Along with the on screen menu, the OSD (On Screen Display) also displays information on the current operating status (counter, playback, recording, TV channel, etc.) on the TV screen. You can switch off the information about the operating status to avoid recording it when recording from additional devices.

'On': The OSD information appears in every selected mode for a few seconds and disappears again.

'Off': The OSD information is switched off. It is **no longer** displayed on the screen.

Auto resume

If playback of a pre-recorded DVD video disc or video CD is interrupted (button **STOP** ) or **OPEN/CLOSE** when the disc is reloaded (disc is started) playback starts at the precise location where it stopped. This applies not only to the current disc but to the last 20 discs played.

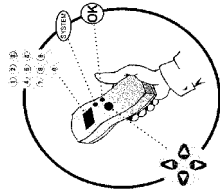
This feature can be switched off if not required.

User preferences

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User preferences



Child lock (DVD and VCD)

This feature enables discs to be locked for children. When Child Lock is on, a 4-digit code (PIN) needs to be entered before a disc can be played. You can also decide whether the inserted disc should always be played or should be played only once, despite the child lock.

•)Play always:

This disc is stored in a memory with space for 50 child-safe discs. If more than 50 discs are stored, the last disc in the list is removed and the new disc is added. The screen shows 'Child safe' at the start of playback.

•)Play once:

This disc is only authorised for single playback. If the recorder is switched off, the PIN code must be re-entered.

Activating/deactivating child lock

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY/ON**.
- 3 Press **SYSTEM-MENU**. The menu bar appears.
- 4 Select the **1** icon using **◀** or **▶**.
- 5 Select **Features** using **▼** or **▲** and confirm with **▶**.
- 6 Confirm **Access control** using **▶**.
- 7 Enter a 4-digit code of your choice. Enter the same code again as confirmation.
- 8 Select **Child lock** using **▲** or **▼** and confirm with **▶**.
- 9 Select the **1** icon using **▼** or **▲**.
- 10 Confirm with **OK**.
- 11 Quit the feature using **◀** and **SYSTEM-MENU**.

Unauthorised discs can only be played by entering the four-digit PIN code. To deactivate the child lock, select the **1** icon in **1**.

Authorising a disc

- 1 Insert a disc. The access control box will appear after a short delay.
- 2 Using **▲** or **▼** select **Play once** or **Play always**.
- 3 Enter your PIN code using the number buttons **0.9**.

Double-sided DVDs may have a different ID for each side. For these discs, each side must be authorised. Multi-volume video CDs may have a different ID for each volume. For these CDs, each volume must be authorised.

Locking unlocked discs

To lock a disc that was formerly authorised follow the instructions below

- 1 Insert a disc. Playback starts automatically. If the playback does not start automatically, press **PLAY/PAUSE▶II**.
- 2 Press the **STOP■** button while the **1** icon is visible. The icon changes to **1**. The disc is now locked.

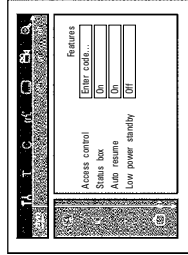
Parental level control (DVD video only)

Films on pre-recorded DVD discs may contain scenes not suitable for children. Therefore, some discs may contain 'Parental Control' rating information that applies to the entire disc or to certain scenes on the disc.

If the disc is rated, scenes are rated from 1 to 8. If such a scene is detected during playback, it compares the scene with the filter value set on the DVD recorder. If the filter value is higher than the setting, an alternative scene is played back where possible.

Activating/deactivating parental level control

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY/ON**.
- 3 Press **SYSTEM-MENU**. The menu bar appears.
- 4 Select the **1** icon using **◀** or **▶**.
- 5 Select **Features** using **▼** or **▲** and confirm with **▶**.



- 6 Confirm 'Access control' using **▶** .
- 7 Enter a 4-digit code of your choice. If the code is new, you may have to enter the code a second time as confirmation.
- 8 Select the 'Parental level' using **▲** or **▼** and confirm with **▶** . A bar appears to select the parental level.
- 9 Select the appropriate rating using **▼** , **▲** or the number buttons 0..9 .

What do the ratings mean?

Rating 0 (displayed as -) : parental control not active.
Rating 1 (suitable for children)
Rating 8 (only suitable for adults)

What happens if a DVD scene contains a higher level than the rating set?
If the recorder does not find a suitable alternative, playback will stop and you must enter the four-digit code.



Tip

- 10 Confirm with **OK** . Quit using **◀** and **SYSTEM-MENU** .

Changing the country

The set filter values depend on the respective country. It is therefore necessary to enter the country to which these filter values apply.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY/ON** .
- 3 Press **SYSTEM-MENU** . The menu bar appears
- 4 Select the **PA** icon using **◀** or **▶** .
- 5 Select line 'Features' using **▼** or **▲** and confirm with **▶** .
- 6 Confirm the line 'Access control' using **▶** .
- 7 Enter your four-digit code.
- 8 Select 'Change country' using **▼** or **▲** and confirm with **▶** .
- 9 Select the corresponding country using **▲** or **▼** and confirm with **OK** .
- 10 To end, press **◀** and then **SYSTEM-MENU** .

Changing the PIN code

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY/ON** .
- 3 Press **SYSTEM-MENU** . The menu bar appears
- 4 Select the **PA** icon using **◀** or **▶** .
- 5 Select 'Features' using **▼** or **▲** and confirm with **▶** .
- 6 Confirm 'Access control' using **▶** .
- 7 Enter your four-digit PIN code.
- 8 Select 'Change code' using **▲** or **▼** and confirm with **▶** .
- 9 Enter the new code using the number buttons 0..9 . Enter the same code again as confirmation.
- 10 Quit using **◀** and **SYSTEM-MENU** .



Tip

I have forgotten my code

Press **STOP** four times, then press **OK** . Access control is now switched off. You can now enter a new code as described above.

If you have any problems using this DVD recorder, the reason may be one of the following. You can also call the **customer service centre** in your country.

The telephone numbers can be found on the back of this instruction manual.

Have the model number (MODEL NO) and the production number (PRODNO) of your recorder ready.

The serial number (PROD. NO.) is printed on the type plate at the back.

ENGLISH

PROBLEM	SOLUTION
Your recorder does not respond to any button being pressed and the display shows 'TV CH' :	<ul style="list-style-type: none">✓Recorder in initial installation mode: Switch on the TV, switch over to the DVD recorder socket. Now the menu for language selection should appear. Please read paragraph 'Initial Installation' in the chapter 'Installing your DVD Recorder'.✓'Dealer-Mode' is switched on: All buttons on the front of the set are locked. Switch off the function:<ol style="list-style-type: none">1 Pull out the mains plug from the wall outlet.2 Press and hold down ■STOP and OPEN/CLOSE and put back the mains plug into the wall outlet.3 As soon as the time or '---' appears in the display (ca. 6 - 10 seconds), release ■STOP and OPEN/CLOSE.
The device does not react when you press a button, although the remote control works:	<ul style="list-style-type: none">✓There is no power supply: check the power supply✓A programmed recording (Timer) is currently being made: If desired, cancel the programmed recording (Timer) with STANDBY.✓There is a technical problem: disconnect from the mains power supply for 30 seconds, then connect again. If this doesn't help, you can reset your DVD recorder to the default factory settings. <p>✓Important: All the information stored (TV channels, time and date, TIMER) will be lost.</p> <ol style="list-style-type: none">1 Disconnect from the mains power supply.2 Press and hold down the STANDBY/ON button on the device and reconnect to the mains power supply.3 Release the STANDBY/ON button when 'TV CH' appears on the display. All the information stored (TV channels, time and date, TIMER) will be lost. <p>Please read paragraph 'Initial Installation' in the chapter 'Installing your DVD Recorder'.</p>
Your DVD recorder does not respond to any button being pressed:	<ul style="list-style-type: none">✓Remote control not pointed toward the DVD recorder: Point the remote control at the machine.✓There is a technical problem: Take out the batteries, wait for 10 seconds and put them in again.✓Batteries are flat: Charge the batteries.
Resetting the machine to the default factory settings	
Remote control does not work:	

PROBLEM	SOLUTION
No playback on DVD recorder:	<ul style="list-style-type: none">✓There is no recording on the disc: Change disc.✓You inserted the wrong disc type: Your recorder can play back the following disc types: DVD Video, (Super)Video CD, DVD-R(W), Audio CD, MP3 CDs✓You inserted the disc the wrong way: Insert the disc with the label facing upwards✓Disc is dirty: Clean the disc✓Wrong region code: The region code of the DVD and the DVD recorder must match.✓Parental control is on: Read chapter 'Access control (child lock)'✓You have selected the wrong programme number for the DVD recorder on the TV: on the TV, select the correct programme number for the DVD recorder.✓The cable connecting the TV set and the DVD recorder has come loose: check the cable.✓It is possible that this (Super) Video CD contains a menu and the 'PBC' is switched off. You can see this in status field 'PBC OFF'. To activate this function, proceed as follows:<ol style="list-style-type: none">1 Press SYSTEM-MENU while the (Super) Video-CD is inserted.2 Select T1 using ◀ or ▶.3 Select line 'Features' using ▼ or ▲ and confirm with ▶.4 Select On in line 'PBC' using ▼ or ▲.5 Confirm with OK and end with SYSTEM-MENU.
I cannot playback (Super) Video CDs	
Poor playback on DVD recorder: (distorted picture/distorted sound)	<ul style="list-style-type: none">✓Your TV set is not properly adjusted.✓Disc is dirty: Clean the disc✓Sometimes the picture may be temporarily distorted. This is not a defect of your DVD recorder.✓The TV channel you want to record is not stored or you selected the wrong programme number: Check TV channels stored.✓Disc write-protected (recording protected): Remove write-protection or change the disc. For more information, please see Preventing accidental erasing of discs in chapter 'Manual Recording'.✓An already finalised DVD+R has been inserted: Change disc.✓You have programmed the wrong time or date: Check time/date.✓You have not set the TIMER properly: Check the programmed recordings (TIMER block).✓Locked disc inserted: Remove disc lock.✓An already finalised DVD+R has been inserted: Change disc.✓VPS/PDC switched on but VPS/PDCtime wrong: Enter VPS/PDCtime exactly to the minute. Check the aerial.
No recording possible:	
Programmed recording does not work:	
The wrong TV channel was decoded (entered) after you programmed a recording using ShowView.	<ol style="list-style-type: none">1 Enter the ShowView programming number of the TV channel you want.2 Confirm with OK.3 Check the programme number/channel name in the 'Prog.' input field4 If this does not correspond to the TV channel you want, select the input field and change the programme number/channel name.5 Confirm with OK.
There is picture or sound interference on TV reception:	<ul style="list-style-type: none">✓Switch to recording mode 'H' with REC MODE during playback from the internal TV tuner (MONITOR button). This will help achieve the best possible picture quality.Before recording, select the recording mode as described in chapter 'Manual Recording', section 'Selecting the recording mode (quality)'.✓Have your aerial checked.✓You will find information on how to change the TV system in 'Manual TV channel search' in 'Installing your DVD recorder'.

PROBLEM	SOLUTION
Distorted sound coming from a connected hi-fi amplifier	✓The DVD recorder is connected to the 'Phono-input' of your amplifier. This socket is provided only for record players without a preamplifier. Select a different audio input.
The picture is distorted or black-and-white during playback	✓The TV system of the disc does not match that of your TV set (PAL/NTSC). ✓The recording can be made in colour only when the TV channels or the connected additional device send a colour signal. Black-and-white signals containing no color information (colour subcarriers) cannot be recorded.
No sound signal at the digital output	✓Check whether the sound settings match the selected inputs and connected additional devices. ✓Check whether you have inserted an MP3 CD. In accordance with SDMI (Secure Digital Music Initiative), the digital audio output is turned off during MP3 playback. This is not a defect of your DVD recorder. ✓If a recording is too short, it is possible that a DVD player cannot detect it. Please observe the following 'Minimum recording times': Recording mode HQ : 5 minutes, SP+ : 15 minutes, EP+ : 20 minutes, EP+ : 30 minutes ✓Some DVD players cannot play back DVD+RW recordings. You can solve this problem by using a special function. You can solve this problem by using a special function: 1 Open the disc tray with OPEN/CLOSE . Insert the disc but do not close the tray. 2 Hold down the number button 2 on the remote control until the tray closes. The disc is modified. 3 If this fails to produce the desired result, repeat the procedure using the number button 3 on the remote control. 4 You can restore the disc to its original condition by pressing 1 .
A DVD+RW disc cannot be played on certain DVD players	Warning! There is a risk that you can no longer play the disc on other DVD players after this procedure. Therefore, apply this function with particular care. ✓If it is impossible to play back a disc, you can try and repair it for new recordings using the following function. This will only prepare the disc for erasing. It will not be erased, however, until the recording has been completed. 1 Clean the disc 2 Open the disc tray with OPEN/CLOSE . Insert the disc but do not close the tray. 3 Hold down CLEAR on the remote control until the tray closes. The disc is prepared for erasing. 4 Start recording as with an empty disc.
Other disc errors	

Before you call an engineer

4. Mechanical Instructions

4.1 Service Positions

4.1.1 Front

Front



Figure 4-1

4.1.2 DVIO board

To put the DVIO board in a service position, an extender board must be used. This extender board can be ordered with codenumber 3104 128 07770.

DVIO Extender

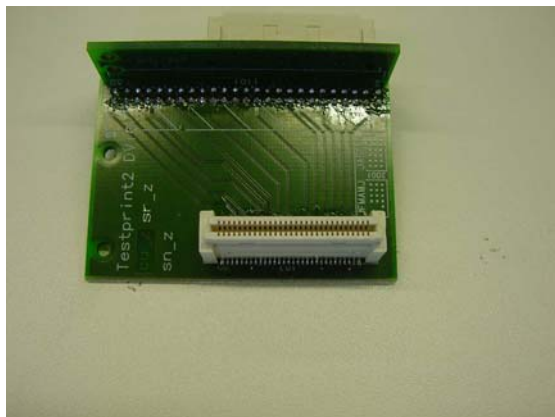


Figure 4-2

DVIO 1



Figure 4-3

DVIO 2

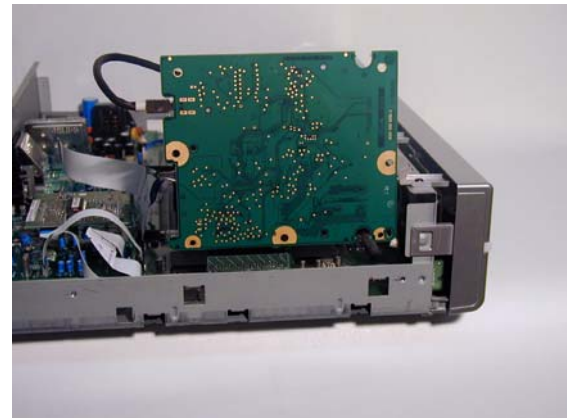


Figure 4-4

4.1.3 Digital board

After demounting of DVIO board, the top side of the digital board is in reach. To reach the bottom side of the digital board, the DVDR module must be demounted together with the digital board. Connected to each other, the assembly can be set in a service position. In this position, the bottom side of the digital board and the servo board are in reach to be serviced.

Digital 1

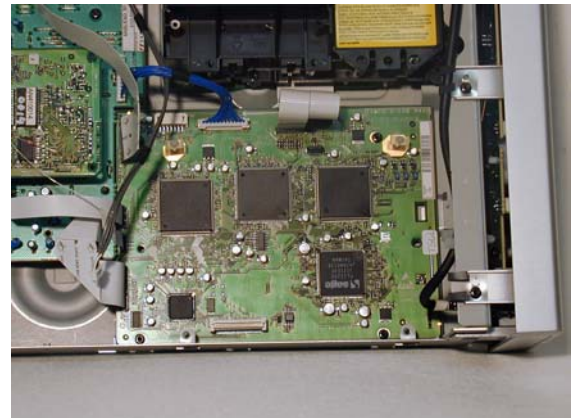


Figure 4-5

Digital 2



Figure 4-6

4.1.4 Analog board

To put the analog board in service position, demount the assembly of analog board and backplate as follows:

1. Remove the screw from the backplate to the mains inlet of the power supply
2. Remove the screw safety holder
3. Remove the 3 screws of the analog board to the frame
4. Release the snap of the spacer of the analog board to the frame.

Turn the assembly of the back plate and the analog board against the loader.

Analog Europe



Figure 4-7

Analog NAFTA



Figure 4-8

4.1.5 Cable Routing

Take care of the correct cable routing. See pictures below.

Europe



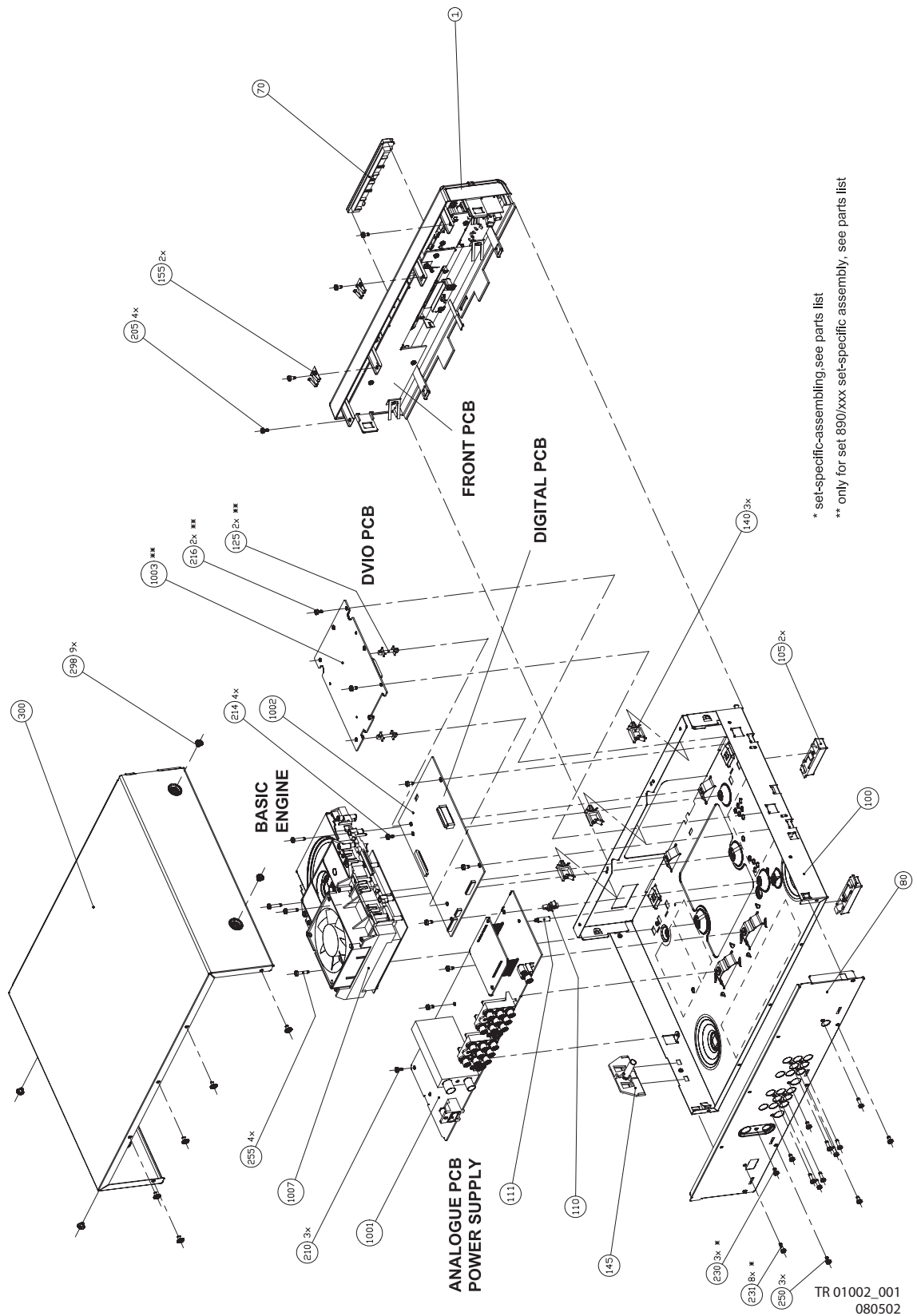
Figure 4-9

NAFTA



Figure 4-10

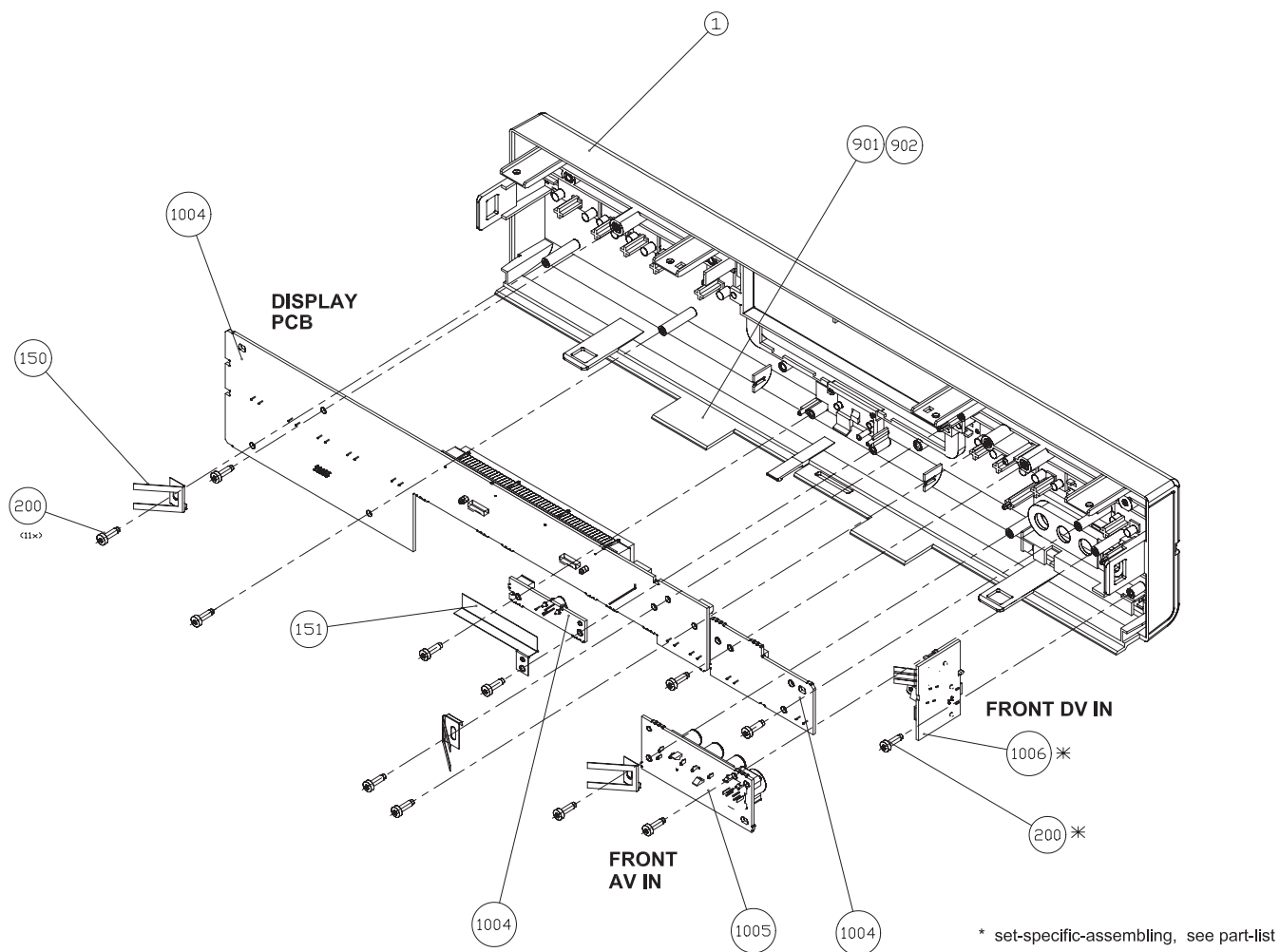
4.2 Exploded View of the Set



* set-specific-assembly, see parts list
 ** only for set 890/xxx set-specific assembly, see parts list

Figure 4-11

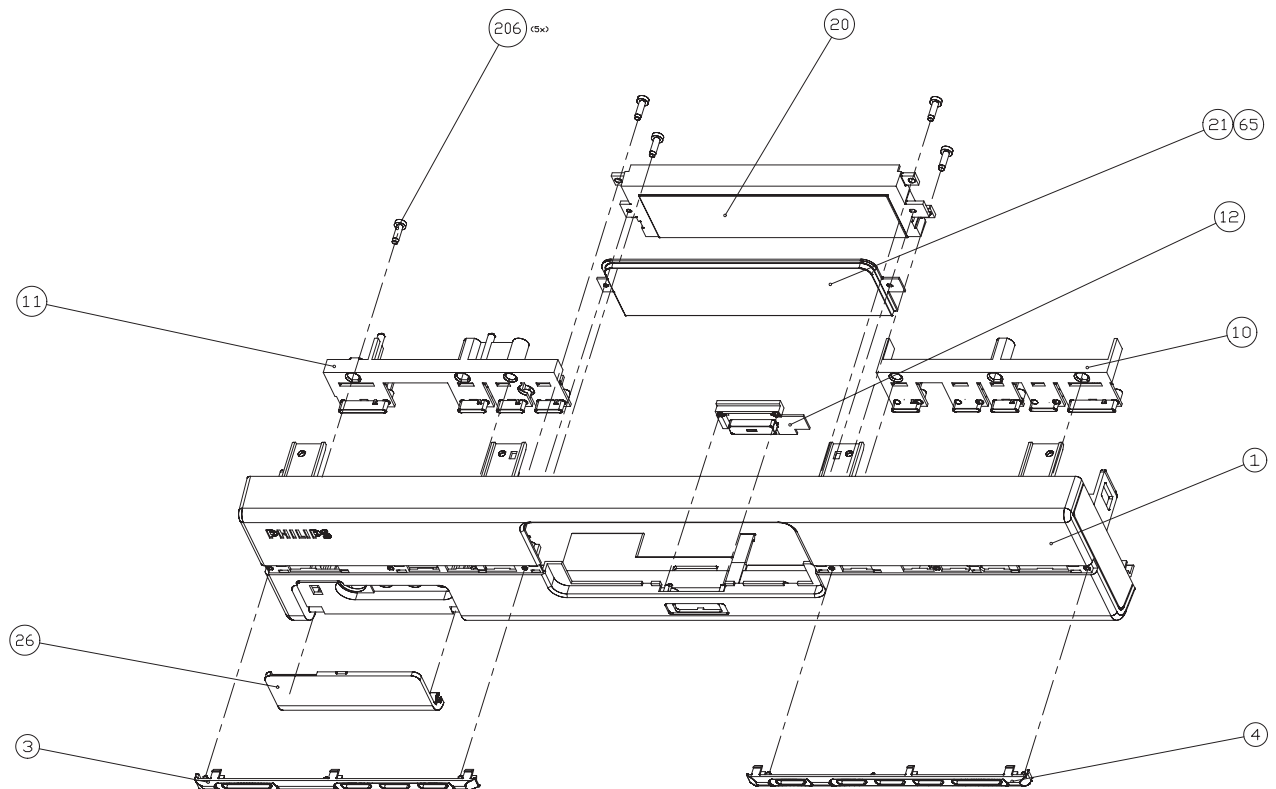
4.3 Exploded View of the complete Front Panel



TR 01003_001
080502

Figure 4-12

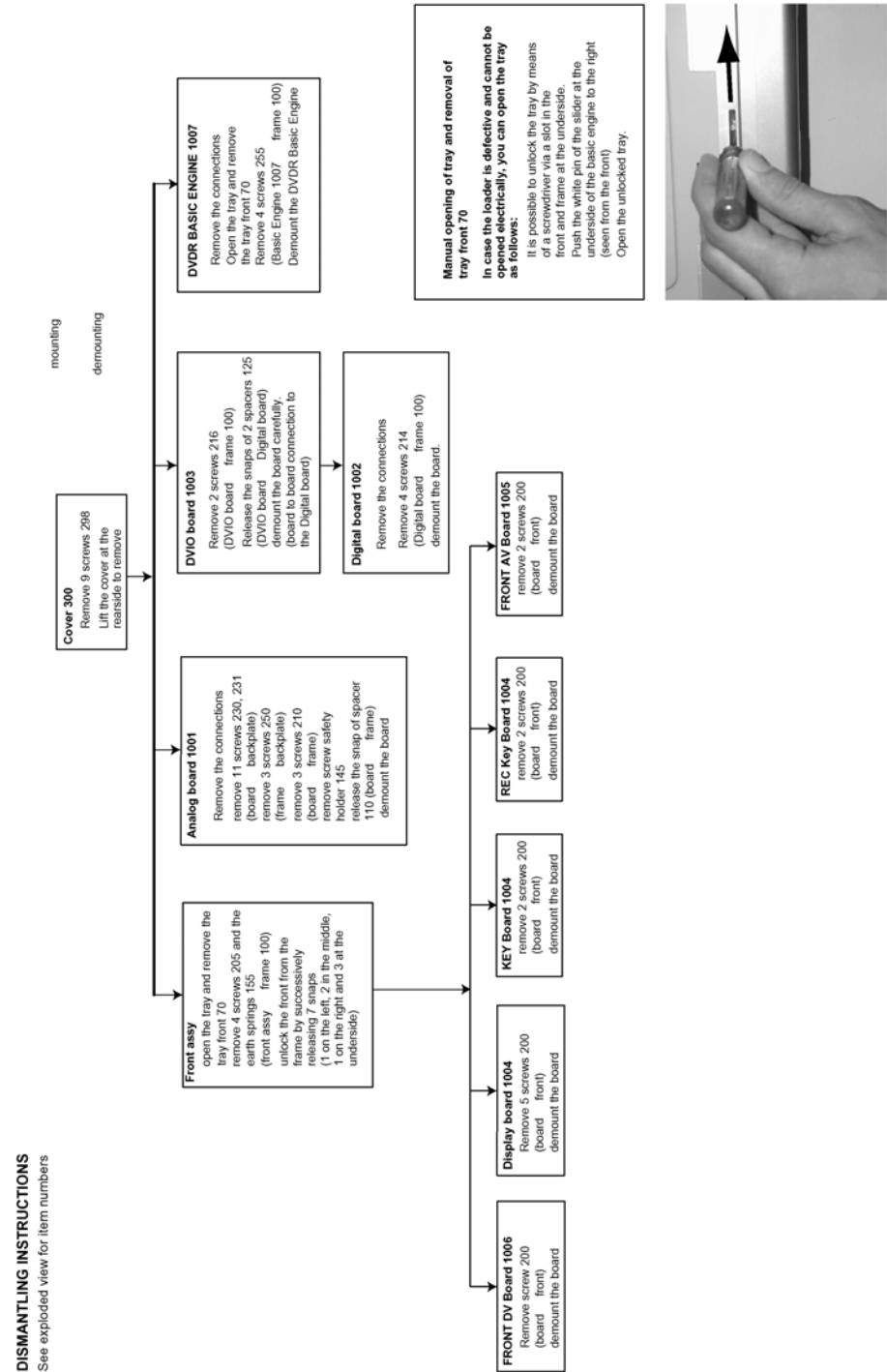
4.4 Exploded View of the Front without PWBs



TR 01004_001
080502

Figure 4-13

4.5 Dismantling Instructions



TR 01005_001
090502

Figure 4-14

Counter	Nucleus	Name	Description
22	104	HostdSdramWrR	checks all memory locations of the 4MB SDRAM
21	106	HostdDramWrR	checks all the DRAM connected to the microprocessor of the digital board
20	123	Hostdl2cNvram	checks the data line (SDA) and the clock line (SCL) of the I2C bus between the host decoder and NVRAM
19	202	SAA7118I2c	checks the interface between the Host I2C controller and the AVENC SAA7118 Video Input Processor
18	200	VideoEncl2c	checks the interface between the host I2C controller and Empress SAA6752
17	207	AudioEncl2c	checks the I2C connection between the host decoder and Empress SAA6752
16	204	AudioEncAccess	tests the HIO8 interface lines between the host decoder and the audio encoder
15	203	AudioEncSramAccess	checks the access of the SRAM by the audio encoder (address and data lines).
14	205	AudioEncSramWrR	tests the SRAM connected to the audio encoder
13	206	AudioEnclInterrupt	tests the interrupt line between the host decoder and the audio encoder
12	300	VsmAccess	checks whether the VSM interrupt controllers and DRAM are accessible
11	303	VsmInterrupt	checks both interrupt lines between the VSM and the host decoder
10	302	VsmSdramWrR	tests the entire SDRAM of the VSM
9	1400	Clock11_289MHz	switches the A_CLK of the micro clock to 11.2896 MHz
8	1401	Clock12_288MHz	switches the A_CLK of the micro clock to 12.288 MHz
7	601	BeS2Bengine	checks the S2B interface with the Basic Engine by sending an echo command
6	500	DisplayEcho	checks the interface between the host processor and the slave processor on the display board
5	700	AnalogueEcho	checks the interface between the host processor and the microprocessor on the analogue board
4	711	AnalogueNvram	checks the NVRAM on the analogue board
3	706	AnalogueTuner	checks whether the tuner on the analogue board is accessible
2	901	LoopAudioUserDealer	This nucleus tests the components on the audio signal path The host decoder - The analogue board - The audio encoder - The VSM On the analogue board the audio is internally looped back to the digital board
1	906	LoopVideoUserDealer	Nucleus for testing the components on the video signal system path: - The VIP - The video encoder - The VSM - The host decoder - The analogue board On the analogue the video signal is internally routed back to the digital board.

5.2 Player Script Interface

5.2.2 Structure of the Player Script

5.2.1 Description

The Player script will give the opportunity to perform a test that will determine which of the DVD recorder's modules are faulty, to read the error log and to perform an endurance loop test. To successfully perform the tests, the DVD recorder must be connected to a TV set.

To be able to check results of certain nuclei, the player script expects some interaction of the user (i.e. to approve a test picture or a test sound). Some nuclei (e.g. nuclei that test functionality of the DVDR module) require that a DVD+RW disc is inserted.

Only tests within the scope of the diagnostic software will be executed hence only faults within this scope can be detected.

The player script consists of a set of nuclei testing the hardware modules in the DVD recorder: the Display PWB, the Digital PWB, the Analogue In/Out PWB and the DVDR module.

Nuclei run by the player test need some user interaction; in the next table this interaction is described. The player test is done in two phases:

- **Interactive tests:** this part of the player test depends strongly on user interaction and input to determine nucleus results and to progress through the full test. Reading the error log information can be useful to determine any errors that occurred recently during normal operation of the DVD player.
- **The loop test** will perform the same nuclei as the dealer test, but it will loop through the list of nuclei indefinitely.

STEP	DESCRIPTION	NUCLEUS
1	Press OPEN/CLOSE and PLAY at the same time and POWER ON the recorder to start the playerscript	2
2	The local display shows FPSEGMENTS . Press PLAY to start the test. First the <i>starburst pattern</i> is lit, then the <i>horizontal segments</i> are lit, followed by the <i>vertical segments</i> and the last test is <i>light all segments</i> test. After each of the 4 tests the user has to confirm that the correct pattern was lit. Press PLAY to confirm that the correct pattern was lit (four times if the FPSEGMENTS test was successful). Press RECORD to indicate that the correct pattern was not successfully lit. Press STOP to skip this nucleus.	502
3	The local display shows FPLABELS . Press PLAY to start the test. Press PLAY to confirm that all labels are lit. Press RECORD to indicate that not all labels are lit. Press STOP to skip this nucleus.	503
4	The local display shows FPLIGHT ALL . Press PLAY to start the test. Press PLAY to confirm that everything was lit. Press RECORD to indicate that not all patterns are lit. Press STOP to skip this nucleus.	520
5	The local display shows FPLED . Press PLAY to start the test. Press PLAY to confirm that the led is lit. Press RECORD to indicate that the led is not lit. Press STOP to skip this nucleus.	504
6	The local display shows FPFLAP OPEN . Press PLAY to start the test. Press PLAY to confirm that the flap has opened. Press RECORD to indicate that the flap did not open. Press STOP to skip this nucleus.	522
7	The local display shows FPKEYBOARD . Press PLAY to start the test. Attention all keys have to be pressed to get a positive result! Press PLAY for more than one second to confirm that all the keys were pressed and shown on the local display. If not all the keys were pressed, a FAIL message will appear on the local display. Press RECORD for more than one second to indicate that not all keys were pressed and shown on the local display. Press STOP for more than one second to skip this nucleus.	505
8	The local display shows FPREMOTE CONTROL . Press PLAY to start the test. Press PLAY to confirm that a key on the remote control was pressed and shown on the local display. Only one key has to be pressed to get a successful result. Press RECORD to indicate that the key on the remote control was pressed but not shown on the local display. Press STOP to skip this nucleus.	506
9	The local display shows FPDIMMER . Press PLAY to start the test. Press PLAY to confirm that the text on the local display was dimmed. Press RECORD to indicate that the text on the local display was not dimmed. Press STOP to skip this nucleus.	518
10	The local display shows FPBEEPER . Press PLAY to start the test. Press PLAY to confirm that the beeper on the front panel sounded. Press RECORD to indicate that the beeper on the front panel did not sound. Press STOP to skip this nucleus.	514
11	The local display shows FPFLAP CLOSE . Press PLAY to start the test. Press STOP to skip this nucleus.	523
12	The local display shows ROUTE VIDEO . Press PLAY to start the test. Press STOP to skip this nucleus.	712
13	The local display shows ROUTE AUDIO . Press PLAY to start the test. Press STOP to skip this nucleus.	713
14	The local display shows COLOUR-BAR ON . Press PLAY to start the test. Press STOP to skip this nucleus.	120

STEP	DESCRIPTION	NUCLEUS
15	The local display shows PINK NOISE ON . Press PLAY to start the test. Press STOP to skip this nucleus.	115
16	The local display shows PINK NOISE OFF . Press PLAY to start the test. Press STOP to skip this nucleus.	116
17	The local display shows SINE ON . Press PLAY to start the test. Press STOP to stop the sine. Press STOP to skip this nucleus.	117
18	The local display shows COLOUR-BAR OFF . Press PLAY to start the test. Press STOP to skip this nucleus.	121
19	The local display shows BERESET . Press PLAY to start the test. Press STOP to skip this nucleus.	603
20	The local display shows BETRAY OPEN . Press PLAY to start the test. Press STOP to skip this nucleus.	616
21	The local display shows BETRAY CLOSE . Press PLAY to start the test. Press STOP to skip this nucleus.	615
22	The local display shows BEWRITE READ . Press PLAY to start the test. Press STOP to skip this nucleus.	617
23	The local display shows BETRAY OPEN . Press PLAY to start the test. Press STOP to skip this nucleus.	616
24	The local display shows BETRAY CLOSE . Press PLAY to start the test. Press STOP to skip this nucleus.	615
25	The local display shows READ ERRORLOG . Press PLAY to start the test. Press STOP to skip this nucleus. If the player test succeeded, the user/dealer script will start in an endless loop. If the player test failed, the local display will display FAIL and the error code	633

Remark

In case of failure, the display shows " FAIL XXXXXX ". The description of the shown error code can be retrieved in the survey of Nuclei Error Codes (paragraph 5.4). Once an error occurs, it is not possible to continue the player script. Unplug the set and restart the player script. By pressing the STOP key, it is possible to jump over the failure and to continue the player script.

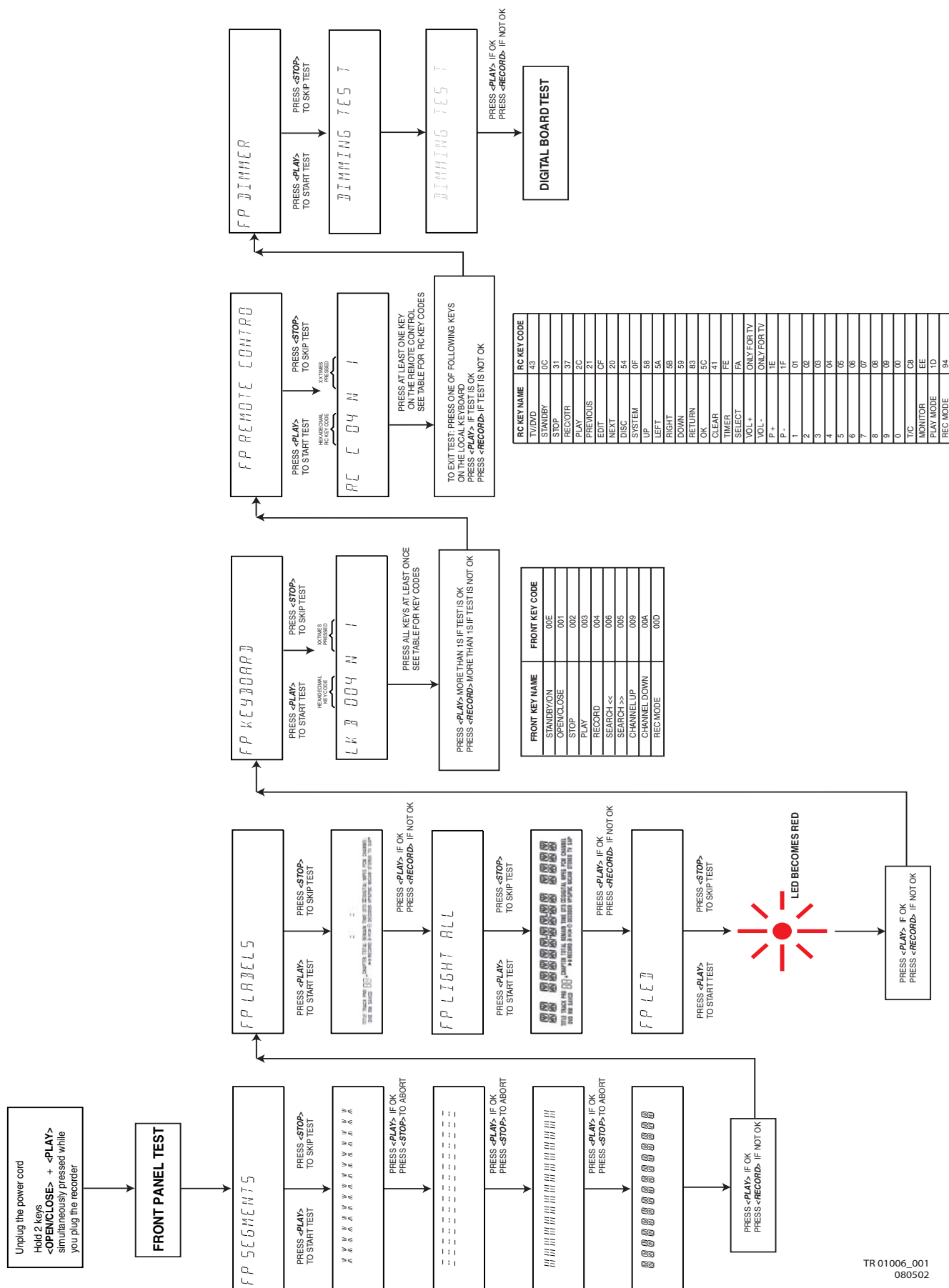


Figure 5-2

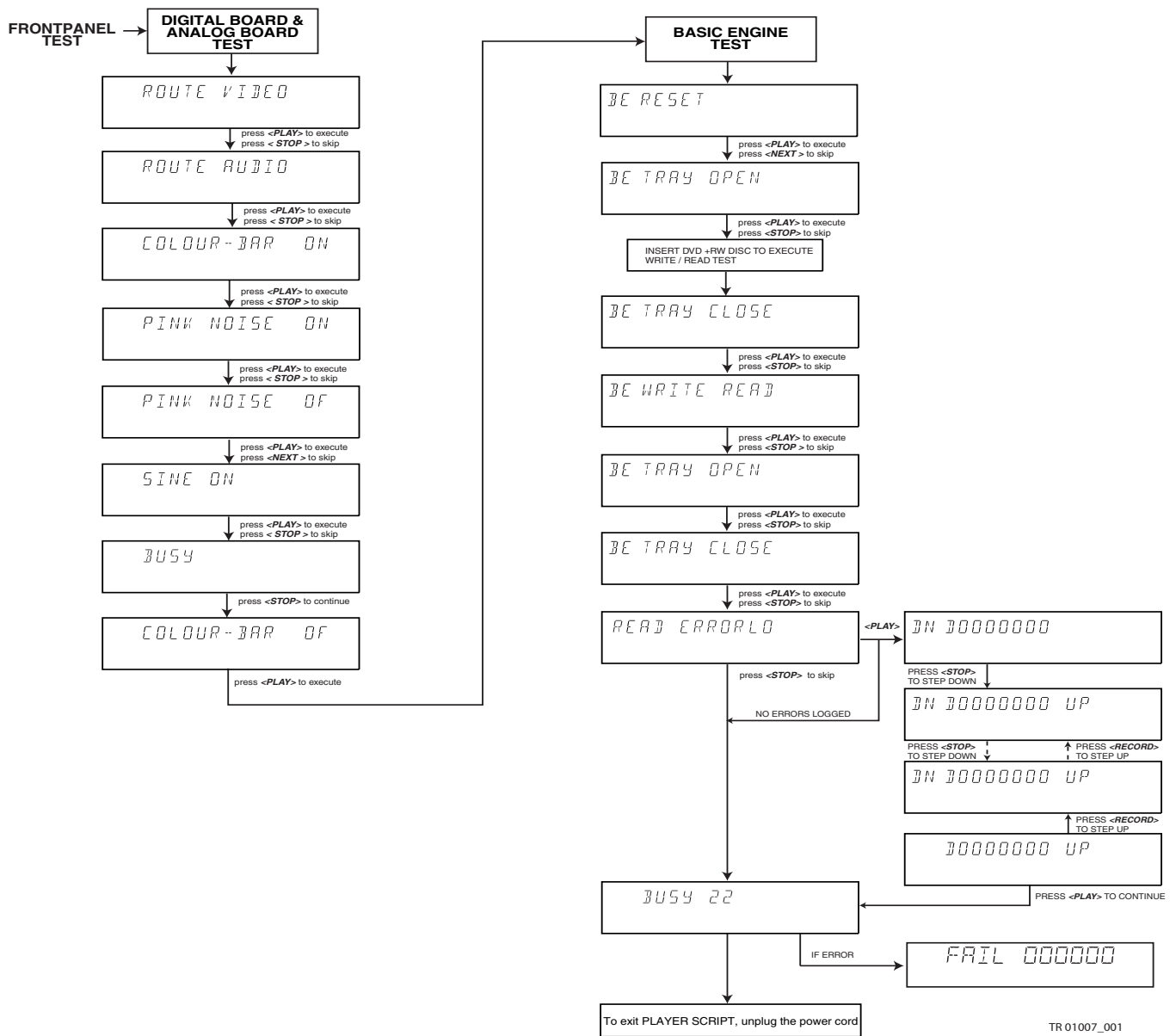
TR 01007_001
080502

Figure 5-3

5.2.3 Error Log

Explanation:

The application errors will be logged in the NVRAM. The maximum number of error bytes that will be visible is 19. The last reported error is shown as DN D0000000, the oldest visible error as D0000000 UP and the errors in between as DN D0000000 UP. DN stands for DOWN, UP stands for UPWARDS. The shown D error codes are identical to the Nuclei Error Codes (paragraph 5.4).

5.2.4 Trade Mode

TRADE MODE

When the recorder is in Trade Mode, the recorder cannot be controlled by means of the front key buttons, but only by means of the remote control.

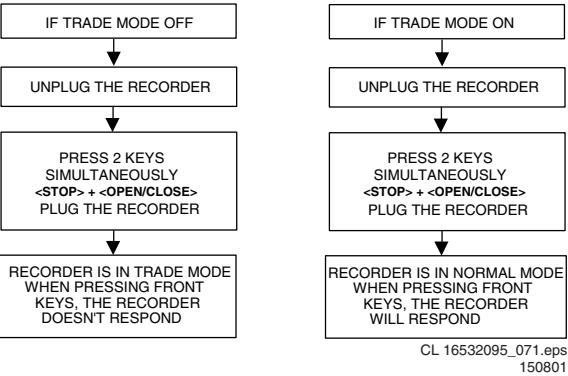


Figure 5-4

5.2.5 Virgin mode

If you want that the recorder starts up in Virgin mode, follow this procedure:

- Unplug the recorder
- plug the recorder again while you keep the STAND BY/ON key pressed
- the set starts up in Virgin mode.

5.3 Menu and Command Mode Interface

5.3.1 Nuclei Numeration

Each nucleus has a unique number of four digits. This number is the input of the command mode.

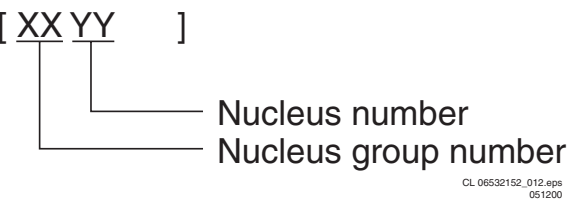


Figure 5-5

The following groups are defined:

Group number	Group name
0	Basic / Scripts
1	Host decoder (Sti5505 and memory)
2	Audio / video encoder (DVDR only)
3	VSM (DVDR only)
4	NVRAM
5	Front Panel
6	Basic Engine
7	Analogue board (DVDR only)
8	DVIO (DVDR only)
9	Loop nuclei (DVDR only)
10	Library sub nuclei (I2C nuclei)
11	User interface
12	Furore (SACD only)
13	DAC (SACD only)
14	Miscellaneous

5.3.2 Error Handling

Each nucleus returns an error code. This code contains six numerals, which means:

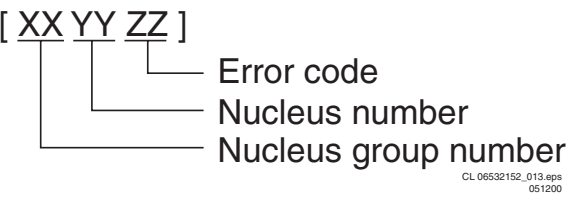


Figure 5-6

The nucleus group numbers and nucleus numbers are the same as above.

5.3.3 Command Mode Interface

Set-Up Physical Interface Components

Hardware required:

- Service PC
 - one free COM port on the Service PC
 - special cable to connect DVD recorder to Service PC
- The service PC must have a terminal emulation program (e.g. OS2 WarpTerminal or Procomm) installed and must have a free COM port (e.g. COM1). Activate the terminal emulation program and check that the port settings for the free COM port are: 19200 bps, 8 data bits, no parity, 1 stop bit and no flow control. The free COM port must be connected via a special cable to the RS232 port of the DVD recorder. This special cable will also connect the test pin, which is available on the connector, to ground (i.e. activate test pin).

Code number of PC interface cable: 3122 785 90017

Activation

Plug the recorder to the mains and the following text will appear on the screen of the terminal (program):

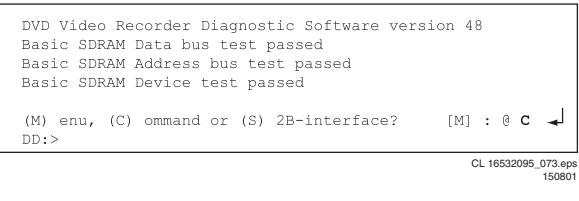


Figure 5-7

The first line indicates that the Diagnostic software has been activated and contains the version number. The next lines are the successful result of the SDRAM interconnection test and the basic SDRAM test. The last line allows the user to choose between the three possible interface forms. If pressing C has made a choice for Command Interface, the prompt ("DD>") will appear. The diagnostic software is now ready to receive commands. The commands that can be given are the numbers of the nuclei.

Command Overview

We provide an overview of the nuclei and their numbers. This overview is preliminary and subject to modifications.

Host Decoder [01]

[xx yy] Number	Nuclei
100	Checksum Flash
101	Flash Write Access 1
102	Flash Write Access 2
103	Flash Write Read
104	SdRam Write Read
105	SdRam Write Read Fast
106	Dram Write Read
107	Dram Write Read Fast
108	Hardware Version
109	Mute On
110	Mute Off
115	Pink Noise On
116	Pink Noise Off
117	Sine On
118	Sine Burst 1kHz
119	Sine Burst 12kHz
120	Colour-bar On Note: Use nucleus 712 with parameter 07 to route the signals to the analogue board output
121	Colour-bar Off
122	NvramWrR
123	NvramI2c
130	Boot Version
131	Application Version
132	Diagnostics Version
133	Download Version
134	Write / read I2C message to / from digital board
135	Video Test Signal OnNote: Use nucleus 712 with parameter 07 to route the signals to the analogue board output. Input: 135 [a] [b] a: Number of test image, 0. Horizontal colour-bar 1. White 2. Yellow 3. Light blue 4. Green 5. Magenta 6. Red 7. Blue 8. Black 9. Colour triangle (execution time is 12 seconds) 10. Test image for progressive scan (execution time is 6 seconds) b: Video standard, 0. PAL BDGHI 1. NTSC
136	Video Test Signal Off
137	Macrovision Off

Audio Video Decoder [02]

[xx yy] Number	Nuclei
200	Video Encoder I2C
202	SAA7118 I2C
203	Audio Encoder SRAM Access
204	Audio Encoder Access
205	Audio Encoder SRAM Write Read
206	Audio Encoder Interrupts

[xx yy] Number	Nuclei
207	Audio Encoder I2C
208	SAA7118 select input
209	Empress Version

VSM [03]

[xx yy] Number	Nuclei
300	Register Access
301	SDRAM Access
302	SDRAM Write Read
303	Interrupt lines
304	VSM Interconnection
305	UART

NVRAM [04]

[xx yy] Number	Nuclei
400	Reset
401	Read
402	Modify
403	UniqueNr Read
404	Read Error Log
407	Reset Error Log
409	Line2 Region-Code Reset
410	UniqueNr Store

Front Panel [05]

[xx yy] Number	Nuclei
500	Echo
501	Version
502	Segment
503	Label
504	Led
505	Keyboard
506	Remote-Control
507	Segment Starburst
508	Segment Vertical
509	Segment Horizontal
514	Beeper
515	Disbar
516	Disbar Dots
517	Vu / Grid
518	Dimmer
519	Blinking
520	Light All Segments
522	Flap Open
523	Flap Close

Basic Engine [06]

[xx yy] Number	Nuclei
600	S2B Pass
601	S2B Echo
602	Version
603	Reset
604	Focus On
605	Focus Off
606	Disc Motor On
607	Disc Motor Off
608	Radial On

[xx yy] Number	Nuclei
609	Radial Off
615	Tray In
616	Tray Out
617	Write Read
618	Write Read Endless Loop
619	Selftest
620	BE Test
621	Laser Test
622	Spindle (Disc) Motor Test
623	Focus Test
624	Sledge Motor Test
625	Sledge Motor Slow
626	Tilt
627	EEPROM Read
628	EEPROM Write
629	Optimise Jitter
630	Radial ATLS Calibration
631	Get Statistics Information
632	Reset Statistics Information
633	BE Read Error Log
634	BE Reset Error Log
638	Get Self Test Result
639	Radial Initialisation
640	Get OPU info

Analog Board [07]

[xx yy] Number	Nuclei
700	Echo
703	Boot Version
704	Hardware Version
705	Clock Adjust
706	Tuner
707	Frequency Download
708	Data Slicer
709	Sound Processor
710	AV Selector
711	Nvram
712	Route Video
713	Route Audio
715	Set Slash Version
716	Application Version
717	Diagnostics Version
718	Download Version
720	Bargraph Level Adjustment
721	Clock correction
722	Clock reference
723	Re-virginise Recorder
724	Flash Checksum
725	Tuner frequency selection Europe: To make video and audio signals from the tuner available on Scart2, send command "712 08". For Nafta/Apac: To make the black/white Video available on Y/C Rear Out connector, send command "712 08" Input: 725 [frequency in MHz*16] [system] System: NTSC=16, PAL BG=16, PAL I=32, PAL DK=48, SEC L=64, SEC LS=80, SEC BG=96, SEC DK=112
727	Set virgin bit
728	Clear Virgin Bit
729	Write / read I2C message to / from analogue board

[xx yy] Number	Nuclei
730	Store external presets
731	Get slash version
732	AFC Reference Voltage Tuner

DVIO [08]

[xx yy] Number	Nuclei
800	Check DVIO board presence
801	Reset DVIO
802	DVIO Access
803	Get DVIO error codes
804	Get DVIO module Ids
805	Execute DVIO module SelfTestInput: 805 [a] [b]Parameters: a=1/0...full Ram test, b=1/0...cable connected
806	Set DVIO led on.
807	Set DVIO led off.

Loop Nuclei [09]

[xx yy] Number	Nuclei
900	Digital Audio Loop(no function in Gen. 1.5 and Lead)
901	User / Dealer Audio Loop
902	Digital Video Loop
903	Digital Video VBI Loop
904	System Video Loop
905	System Video VBI Loop
906	User / Dealer Video Loop
907	User / Dealer Video VBI Loop
908	System Audio Loop SCART
909	System Audio Loop CINCH
910	Digital DVIO Video Loop
911	System Video Vip

Miscellaneous [14]

[xx yy] Number	Nuclei
1400	Clock 11.289 MHz
1401	Clock 12.288 MHz
1412	Progressive Scan I2C
1413	Progressive Scan test image on
1414	Progressive Scan test image off
1415	Progressive Scan Route Enable
1416	Progressive Scan Route Disable

Scripts [00]

[xx yy] Number	Nuclei
1	UserDealer Script
2	Player Script

Routing Audio and Video*Route Video*

Nucleus Number: 712

Description

This nucleus routes the video signals on the analogue board to the destination determined by the input parameters

The paths that are available for video routing and their description(Europe version):

Path ID	Description
00	Input signal is VIDEO(CVBS) from digital board and will be re-routed back to the digital board.
01	Input signal is from FRONT VIDEO(CVBS) IN and will be routed to the digital board.
02	No Routing.
03	Input signal is from FRONT S-VIDEO(Y/C) and will be routed to the digital board.
04	No Routing.
05	Input signal is CVBS from SCART1 and will be routed to the digital board.
06	Input signal is CVBS from SCART2 and will be routed to the digital board.
07	Input Signal is CVBS from Digital Board and it will be routed to Scart1 and Scart2.
08	Input signal is VIDEO(CVBS) from ANTENNA IN and will be routed to SCART2.
09	Input signal is VIDEO(CVBS) from SCART1 and will be routed to SCART2.
10	Input signal is VIDEO(CVBS) from SCART2 and will be routed to SCART1.
11	Signal path is routed Fast Blank from Scart2 pin16 and will be routed Scart1 pin16
12	Input Signal is YC from Digital Board and it will be routed to Scart1.
13	No Routing.
14	No Routing.
15	Input Signal is CVBS from TUNER and it will be routed to Digital .
16	No Routing.
17	Input Signal is routed from digital board YC to REAR S-VIDEO(YC) OUT
18	Signal path is routed from digital board RGB to RGB SCART1 and from digital board CVBS to digital board CVBS.
19	No Routing.
20	Input RGB Signal is routed from Digital Board to SCART1(RGB),Input CVBS Signal from Digital Board to Digital Board and Fast Blanking Signal from Scart 2 to Scart1.
21	Input Y/C Signal from Digital Board is routed to Rear Y/C Connector and Input Y/c Signal from Front Y/C connector is routed to Digital Board.

The paths that are available for video routing and their description (Nafta region):

PATH ID	DESCRIPTION
00	Input signal is VIDEO(CVBS) from digital board and will be re-routed back to the digital board.A Cinch Cable need to be connected from Rear Cinch Out to Front Cinch In for this Test.(Direct routing on analogue board from YUV In to YUV Out is not Possible)
01	Input signal is from FRONT VIDEO(CVBS) IN and will be routed to the digital board.This routing is same as the above path id.
02	Input signal is from REAR VIDEO(CVBS) IN and will be routed to the digital board.
03	Input signal is from FRONT S-VIDEO(Y/C) IN and the signal received will be routed to the digital board.
04	Input signal is from REAR S-VIDEO(Y/C) IN and will be routed to the digital board.
05	No Routing.
06	No Routing.
07	No Routing.
08	Input signal is VIDEO(CVBS) from TUNER and will be routed to Y Pin of Rear Y/C Connector.This will give only black/White Picture .
09	Input signal is from YUV IN and will be routed to YUV OUT.This is possible only if Digital Board routes back YUV signal received back to the Analogue board(DENC)
10	No Routing.
11	No Routing.
12	No Routing.
13	No Routing.
14	No Routing
15	Input CVBS Signal from Tuner is routed to Digital Board..
16	No Routing
17	Input RGB Signal is routed from Digital Board to RGB Rear Out and Input CVBS Signal is routed from Rear Cinch In 1 to Digital Board(This second step is for routing Input CVBS Signal from Digital Board to Digital Board again - A Cinch cable need to be connected from Rear Cinch Out1 to Rear Cinch In 1)
18	Input Signal from CVBS Rear In is routed to Digital Board.This is same as path id 02.
19	Input Y/C signal from Digital Board is routed to Y/C Rear Out Connector and Input signal from Y/C Rear In Connector is routed to Y/C Digital Board.

23	The Video signal received from the Digital board will be outputted on Modulator channel 3. Please use command 120 for testing Video because Nuclei 120 will generate the Colour Bar signal on the digital Board.
24	The Audio signal received from the Digital board will be outputted on Modulator channel 4. Please use command 120 for testing Video because Nuclei 120 will generate the Colour Bar signal on the digital Board.

Example

DD:> 712 01

71200: Video routing on the Analogue Board OK.

Test OK @

Description

This nucleus routes the audio on the analogue board to the destination determined by the input parameters

The paths that are available for audio routing and their description (Europe version)

Route Audio

Nucleus Number: 713

PATH ID	DESCRIPTION
00	No Routing.
01	Input signal is from FRONT AUDIO IN and will be routed to the digital board.
02	Input signal is from REAR AUDIO IN 2 and will be routed to the digital board.
03	Input Audio Signal is routed from FRONT Cinch In to Digital Board.(This is same as path id 01)
04	Input Signal is from Rear Cinch In1 and it will be routed to Digital Board..
05	No routing.
06	No routing.
07	No routing.
08	No Routing.
09	No routing.
10	No Routing.
11	No Routing.
12	No Routing.
13	Input Signal is from Digital Board and it will be routed to the digital board.
14	No routing.
15	Input is Audio Signal from TUNER and it will be routed to Digital Board.
16	Input signal is AUDIO from dvio board and will be routed to Digital Board.
17	No routing.
18	No routing.
19	No routing.
20	Input signal is from REAR AUDIO IN 2 and will be routed to the digital board.
21	Input signal is from REAR AUDIO IN 1 and will be routed to the digital board.
22	Input signal is from REAR AUDIO IN 1 and will be routed to the digital board.
23	The Audio signal received from the Digital board will be outputted on Modulator channel 3. Please use command 117 for testing audio because Nuclei 117 will generate the Audio signal on the digital Board.
24	The Audio signal received from the Digital board will be outputted on Modulator channel 4. Please use command 117 for testing audio because Nuclei 117 will generate the Audio signal on the digital Board.

EXAMPLE

DD:> 713 00

71300: Audio routing on the Analogue Board OK.

Test OK @

5.3.4 Menu Mode Interdace

Activation

Plug the recorder to the mains and the following text will appear on the screen of the terminal (program):

```
DVD Video Recorer Diagnostic Software version 48
Basic SDRAM Data bus test passed
Basic SDRAM Address bus test passed
Basic SDRAM Device test passed

(M) enu, (C) ommand or (S) 2B-interface?   [M] : @ M ↵

Main Menu

1.  Digital Board           ->
2.  Analogue Board         ->
3.  Front Panel             ->
4.  Basic Engine            ->
5.  DVIO                    ->
6.  Progressive Scan Board ->
7.  Loop tests              ->
8.  Log                     ->
9.  Scripts                 ->

Select>
```

Figure 5-8

The first line indicates that the Diagnostic software has been activated and contains the version number. The next lines are the successful result of the SDRAM interconnection test and the basic SDRAM test. The last line allows the user to choose between the three possible interface forms. If pressing M has made a choice for Menu Interface, the Main Menu will appear.

Menu Structure

The following menu structure is given after starting up the DVD recorder in menu mode. The symbol -> indicates that the current menu choice will invoke the display of a submenu.

Main Menu

- 1.Digital Board ->
- 2.Analogue Board ->
- 3.Front Panel ->
- 4.Basic Engine ->
- 5.DVIO ->
- 6.Progressive Scan Board ->
- 7.Loop Tests ->
- 8.Log ->
- 9.Scripts ->

Digital Board Menu

- 1.Host Decoder ->
- 2.VSM ->
- 3.AVENC ->
- 4.NVRAM ->

Host Decoder Menu

- 1.Flash Checksum
- 2.Flash1 Write Access
- 3.Flash2 Write Access
- 4.Flash Write/Read
- 5.Host SDRAM Write/Read
- 6.Host SDRAM Fast Write/Read
- 7.Host DRAM Write/Read
- 8.Host DRAM Fast Write/Read
- 9.I2C NVRAM
- 10.NVRAM Write/Read
- 11.Engine S2B Echo
- 12.Versions ->
- 13.Audio Mute ->
- 14.Colourbar ->
- 15.Pink Noise ->
- 16.Sine Generate ->

Digital Board Versions Menu

- 1.Hardware Version
- 2.Bootcode version
- 3.Applications Version
- 4.Diagnostics Version
- 5.Download Version

Audio Mute Menu

- 1.Audio Mute On
- 2.Audio Mute Off

Colourbar Menu

- 1.Colourbar On
- 2.Colourbar Off

Pink Noise Menu

- 1.Pink Noise On
- 2.Pink Noise Off

Sine Generate Menu

- 1.Sine On
- 2.Sine Burst 1kHz
- 3.Sine Burst 12kHz

VSM Menu

- 1.Register Access
- 2.SDRAM Access
- 3.VSM SDRAM Write/Read
- 4.Interrupt Lines
- 5.VSM Interconnection
- 6.UART

AVENC Menu

- 1.Empress ->
- 2.Video Input Processors ->

Empress Menu

- 1.Version number

Video Input Processors Menu

- 1.SAA7118 I2C Access

NVRAM Menu

- 1.Read Error Log
- 2.Reset Error Log
- 3.Read DVIO Unique ID

Analogue Board Menu

- 1.Echo
- 2.Obsolete
- 3.Route Video Input back to Digital board
- 4.Route Audio Input back to Digital board
- 5.Flash Checksum
- 6.Versions ->
- 7.Components ->
- 8.Re-virginize Recorder ->

Analogue Board Versions Menu

- 1.Hardware Version
- 2.Bootcode version
- 3.Application version
- 4.Diagnostics version
- 5.Download version

Analogue Components Menu

- 1.Tuner
- 2.Data Slicer
- 3.Sound Processor
- 4.AV Selector
- 5.NVRAM

Analogue Board Re-virginize Menu

- 1.Re-virginize Recorder
- 2.Set Virgin-bit
- 3.Clear Virgin-bit
- 4.Store external presets

Front Panel Menu

- 1.Echo
- 2.Version
- 3.Flapp Control ->
- 4.Segment Test ->
- 5.Light Labels
- 6.Led test
- 7.Keyboard test
- 8.Remote Control
- 9.Beep
- 10.Disc Bar
- 11.Disc Bar Dots
- 12.Vu Grid
- 13.Dimmer
- 14.Blink
- 15.Light All Segments

Flap Control Menu

- 1.Open Flap
- 2.Close Flap

Segment Test Menu

- 1.Starburst
- 2.Light Horizontal Segments
- 3.Light Vertical Segments
- 4.Light All Segments

Basic Engine Menu

- 1.Reset
- 2.S2B Pass-through
- 3.S2B Echo
- 4.Focus On
- 5.Focus Off
- 6.Version
- 7.Self Test
- 8.Get Self Test Result
- 9.Basic Engine Test
- 10.Laser Test
- 11.Focus Test
- 12.Tilt Test
- 13.Optimise Jitter
- 14.Statistics Info
- 15.Log ->
- 16.Spindle Motor ->
- 17.Radial ->
- 18.Sledge ->
- 19.Tray ->

Basic Engine Error Log

- 1.Read Error Log
- 2.Reset Error Log

Basic Engine Spindle Motor Menu

- 1.Spindle Motor On
- 2.Spindle Motor Off
- 3.Spindle Motor Test

Basic Engine Radial Menu

- 1.Radial On
- 2.Radial Off
- 3.Radial Initialisation
- 4.Radial ATLS Calibration

Basic Engine Sledge Menu

- 1.Sledge test
- 2.Sledge test slow

Basic Engine Tray Menu

- 1.Tray In
- 2.Tray Out

DVIO Menu

- 1.Check Presence
- 2.Reset
- 3.Access
- 4.Error Codes
- 5.Module Identifiers
- 6.Led ->

DVIO Led Menu

- 1.Led On
- 2.Led Off

Progressive Scan Board Menu

- 1.I2C Access
- 2.Test Image On
- 3.Test Image Off

Loop Tests Menu

- 1.Digital Board Loops ->
- 2.User/Dealer Loops ->
- 3.System Loops ->
- 4.Basic Engine Loops ->

Digital Board Loops Menu

- 1.Obsolete
- 2.Digital Video Loop
- 3.Digital Video Loop VBI

User/Dealer Loops Menu

- 1.User/Dealer Audio Loop
- 2.User/Dealer Video Loop
- 3.User/Dealer Video Loop VBI

System Loops Menu

- 1.System Video Loop
- 2.System Video Loop VBI
- 3.System Audio Loop SCART(EURO)
- 4.System Audio Loop CINCH (NAFTA)

Basic Engine Loops Menu

- 1.Basic Engine write read
- 2.Basic Engine write read endless loop

Log Menu

- 1.Read Error Log
- 2.Reset Error Log

Script Menu

- 1.User/Dealer Script
- 2.Player Script

5.4 Nuclei Error Codes

In the following table the error codes will be described.

Error Nr	Error String
10000	"Checksum is OK"
10001	"segment name Checksum doesn't match" or "segment name segment not found"
10100	""
10101	"FLASH 1 Write access test failed"
10200	""
10201	"FLASH 2 Write access test failed"
10300	""
10301	"FLASH write test failed"
10302	"FLASH write command failed"
10303	"FLASH write test done max. number of times"
10400	""
10401	"HostDec SDRAM Memory data bus test goes wrong."
10402	" HostDec SDRAM Memory address bus test goes wrong."
10403	" HostDec SDRAM Physical memory device test goes wrong."
10500	""
10501	" HostDec SDRAM Memory data bus test goes wrong."
10502	" HostDec SDRAM Memory address bus test goes wrong."
10503	" HostDec SDRAM Physical memory device test goes wrong."
10600	""
10601	"HostDec DRAM Memory data bus test goes wrong."
10602	"HostDec DRAM Memory address bus test goes wrong."
10603	"HostDec DRAM Physical memory device test goes wrong."
10700	""
10701	"HostDec DRAM Memory data bus test goes wrong."
10702	"HostDec DRAM Memory address bus test goes wrong."
10703	"HostDec DRAM Physical memory device test goes wrong."

Error Nr	Error String
10800	"Host Decoder version(cut) number: version number""Digital hardware version"
10801	"Can not find version in FLASH."
10900	""
10901	"Error muting audio"
11000	""
11001	"Error demuting audio"
11500	""
11501	"Init of I2C failed"
11502	"The selection of the clock source failed"
11504	"The demute of the audio failed"
11600	""
11601	"Init of I2C failed"
11602	"The mute of the audio failed"
11700	""
11701	"Init of I2C failed"
11702	"The muting of the audio failed"
11703	"The demute of the audio failed"
11704	"The selection of the clock source failed"
11707	"Setup of Front panel failed"
11708	"Sine on Front panel keyboard failed"
11800	""
11801	"Init of I2C failed"
11802	"The muting of the audio failed"
11803	"The demute of the audio failed"
11804	"The selection of the clock source failed"
11805	"Error cannot start VSM audio in port"
11900	""
11901	"Init of I2C failed"
11902	"The muting of the audio failed"
11903	"The demute of the audio failed"
11904	"The selection of the clock source failed"
11905	"Error cannot start VSM audio in port"
12000	""
12001	"Invalid input"
12100	""
12200	""
12201	"I2C bus busy before start"
12202	"NVRAM access time-out"
12203	"No NVRAM acknowledge"
12204	"NVRAM time-out"
12205	"NVRAM Write/Read back failed"
12300	""
12301	"I2C bus busy before start"
12302	"NVRAM read access time-out"
12303	"No NVRAM read acknowledge"
12304	"NVRAM read failed"
13000	"Bootcode application version : bootversion"
13001	"Can not find version in FLASH."
13100	"Recorder application version : recorderversion"
13101	"Can not find version in FLASH."
13200	"Diagnostics application version : diagversion"
13201	"Can not find version in FLASH."
13300	"Download application version : downloadversion"
13301	"Can not find version in FLASH."
13700	""
13701	"Turning off MacroVision failed"
20000	""
20001	"I2C bus busy before start"
20002	"Video Encoder access time-out"
20003	"No acknowledge from Video Encoder"

Error Nr	Error String
20004	"No data send/received to or from Video Encoder"
20005	"SAA7118 VIP can not be initialised"
20200	""
20201	"I2C bus busy before start"
20202	"SAA7118 VIP access time-out"
20203	"No acknowledge from SAA7118 VIP"
20204	"No data received from SAA7118 VIP"
20300	""
20301	"Error audio encoder SRAM access cannot initialise I2C"
20302	"Error audio encoder SRAM access cannot reset DSP through I2C"
20303	"Error audio encoder SRAM access cannot download boot"
20304	"Error audio encoder cannot download test code"
20305	"Error audio encoder cannot obtain result of test"
20306	"Error audio encoder SRAM access stuck-at-zero data line "
20307	"Error audio encoder SRAM access stuck-at-one data line "
20308	"Error audio encoder SRAM access stuck-at-one address line "
20309	"Error audio encoder SRAM access address line address line x is connected to data line data line y"
20310	"Error audio encoder SRAM access address lines address line x and address line y are connected "
20311	"Error audio encoder SRAM access data lines data line x and data line y are connected "
20312	"Error audio encoder SRAM access illegal data received"
20400	""
20401	"Error audio encoder access cannot initialise I2C"
20402	"Error audio encoder access cannot reset DSP through I2C"
20403	"Error audio encoder accessing ICR register"
20404	"Error audio encoder access stuck-at-zero of data line "
20405	"Error audio encoder access stuck-at-one of data line "
20406	"Audio encoder access data lines data line x and data line y are interconnected "
20500	""
20501	"Error audio encoder SRAM WRR cannot initialise I2C"
20502	"Error audio encoder SRAM WRR cannot reset DSP through I2C"
20503	"Error audio encoder WRR cannot download boot"
20504	"Error audio encoder cannot download test code"
20505	"Error audio encoder SRAM WRR cannot obtain result of test"
20506	"Error audio encoder WRR SRAM stuck-at-zero data bit "
20507	"Error audio encoder WRR SRAM stuck-at-one data bit "
20508	"Error audio encoder WRR SRAM data lines data line x and data line y are connected"
20509	"Error audio encoder WRR SRAM illegal data received"
20600	""
20601	"Error audio encoder interrupt cannot initialise I2C"
20602	"Error audio encoder interrupt cannot reset DSP through I2C"
20603	"Error audio encoder cannot download test code"
20604	"Error occurred accessing VSM"
20605	"Audio encoder interrupt not received"

Error Nr	Error String
20606	"Error occurred while activating the encoder"
20607	"Error audio encoder interrupt cannot initialise empress"
20608	"Error occurred while getting interrupt reason"
20700	""
20701	"Error audio encoder I2C cannot reset DSP through I2C"
20702	"Error audio encoder cannot download boot"
20703	"Error audio encoder cannot download TEST code"
20704	"Error audio encoder I2C bus busy"
20705	"Error audio encoder I2C cannot write slave address"
20706	"Error audio encoder I2C no acknowledge received"
20707	"Error audio encoder I2C cannot send/receive data"
20708	"Error audio encoder received data through I2C was invalid"
20800	""
20801	"I2C access failed."
20802	"SAA7118 VIP can not be initialised."
20803	"Invalid input"
20900	"B1.B2. B3.B4. B5.B6. B7.B8. B9.B10. B11.B12."
20901	"Firmware download of EMPRESS failed"
20902	"I2C bus busy before start"
20903	"EMPRESS access time-out"
20904	"No acknowledge from the EMPRESS"
20905	"No data send to the EMPRESS"
20906	"No data received from the EMPRESS"
30000	""
30001	"VSM SDRAM Bank1 Memory databus test goes wrong."
30002	"VSM SDRAM Bank1 Memory addressbus test goes wrong."
30003	"VSM SDRAM Bank1 Physical memory device test goes wrong."
30004	" VSM SDRAM Bank2 Memory databus test goes wrong."
30005	" VSM SDRAM Bank2 Memory addressbus test goes wrong."
30006	" VSM SDRAM Bank2 Physical memory device test goes wrong."
30007	"VSM SDRAM Bank1 VSM interrupt register A has a -stuck at- error for value:"
30008	"VSM SDRAM Bank2 VSM interrupt register A has a -stuck at- error for value:"
30100	""
30101	"VSM SDRAM Bank1 Memory databus test goes wrong."
30102	"VSM SDRAM Bank1 Memory addressbus test goes wrong."
30103	"VSM SDRAM Bank1 Physical memory device test goes wrong."
30104	" VSM SDRAM Bank2 Memory databus test goes wrong."
30105	" VSM SDRAM Bank2 Memory addressbus test goes wrong."
30106	" VSM SDRAM Bank2 Physical memory device test goes wrong."
30200	""
30201	"VSM SDRAM Bank1 Memory databus test goes wrong."
30202	"VSM SDRAM Bank1 Memory addressbus test goes wrong."

Error Nr	Error String
30203	"VSM SDRAM Bank1 Physical memory device test goes wrong."
30204	" VSM SDRAM Bank2 Memory databus test goes wrong."
30205	" VSM SDRAM Bank2 Memory addressbus test goes wrong."
30206	" VSM SDRAM Bank2 Physical memory device test goes wrong."
30300	""
30301	"VSM interrupt register A has a -stuck at- error for value:"
30302	"VSM interrupt register B has a -stuck at- error for value:"
30303	"Interrupt A wasn't raised."
30304	"Interrupt B wasn't raised."
30305	"Interrupts A and B were raised."
30400	""
30401	"VSM SDRAM Bank1 Memory databus test goes wrong."
30402	"VSM SDRAM Bank1 Memory addressbus test goes wrong."
30403	"VSM SDRAM Bank1 Physical memory device test goes wrong."
30404	" VSM SDRAM Bank2 Memory databus test goes wrong."
30405	" VSM SDRAM Bank2 Memory addressbus test goes wrong."
30406	" VSM SDRAM Bank2 Physical memory device test goes wrong."
30500	""
30501	"Communication with the analogue board fails."
30502	"Echo test to analogue board returned wrong string."
40000	""
40001	"NVRAM Reset; I2C failed"
40100	"NVRAM address = 0xaddress -> Byte value = 0xvalue"
40101	"NVRAM Read; I2C failed"
40102	"NVRAM Read; Invalid input"
40200	""
40201	"NVRAM Modify; I2C failed"
40202	"NVRAM Modify; Invalid input"
40300	"DV Unique ID = id"
40301	"NVRAM Read DV Unique ID; I2C failed"
40400	"\r\n Error log:\r\n errorString \r\n Ö "
40401	"NVRAM error log; I2C failed"
40402	"NVRAM error log is invalid"
40403	"Front panel failed"
40700	""
40701	"NVRAM error log reset; I2C failed"
40900	"Region code Change counter is reset"
40901	"NVRAM region code reset; I2C failed"
41000	""
41001	"NVRAM Store DV Unique ID; I2C failed"
41002	"NVRAM Store DV Unique ID; Invalid input"
50000	""
50007	"Execution of the command on the analogue board failed."
50008	"The frontpanel could not be accessed by the analogue board."
50009	"The echo from the frontpanel processor was not correct."
50100	" Front panel version: FPversion "

Error Nr	Error String
50102	"Execution of the command on the analogue board failed."
50103	"The frontpanel could not be accessed by the analogue board."
50200	""
50204	"Execution of the command on the analogue board failed."
50205	"The frontpanel could not be accessed by the analogue board."
50206	"The frontpanel did not show a starburst."
50207	"The user skipped the FP-which pattern test."
50208	"The user returned an unknown confirmation: confirmation "
50209	"The frontpanel did not show horizontal segments."
50210	"The frontpanel did not show vertical segments."
50300	""
50304	"Execution of the command on the analogue board failed."
50305	"The frontpanel could not be accessed by the analogue board."
50306	"The frontpanel did not light all labels."
50307	"The user skipped the rest of the FP-label test."
50308	"The user returned an unknown confirmation: confirmation"
50400	""
50404	"Execution of the command on the analogue board failed."
50405	"The frontpanel could not be accessed by the analogue board."
50406	"The LED's could not be turned on."
50407	"The user skipped the rest of the FP-LED test."
50408	"The user returned an unknown confirmation: confirmation"
50500	""
50502	"Front panel Keyboard; test failed"
50503	"Front panel Keyboard; test aborted"
50504	"Front panel Keyboard; not all keys were pressed"
50505	"Front panel keyboard I2C connection failed"
50506	"Unable to get slashversion"
50600	""
50602	"Front panel Remote control; test failed"
50603	"Front panel Remote control; test aborted"
50604	"Front panel remote control; can not access FP"
50605	"Front panel remote control; no user input received"
50700	""
50701	"Execution of the command on the analogue board failed."
50702	"The frontpanel could not be accessed by the analogue board."
50703	"The frontpanel did not show a starburst."
50704	"The user skipped the FP-starburst test."
50705	"The user returned an unknown confirmation: confirmation "
50800	""
50801	"Execution of the command on the analogue board failed."
50802	"The frontpanel could not be accessed by the analogue board."
50803	"The frontpanel did not show vertical segments."
50804	"The user skipped the FP-vertical segments test."
50805	"The user returned an unknown confirmation: confirmation "
50900	""

Error Nr	Error String
50901	"Execution of the command on the analogue board failed."
50902	"The frontpanel could not be accessed by the analogue board."
50903	"The frontpanel did not show horizontal segments."
50904	"The user skipped the FP-horizontal segments test."
50905	"The user returned an unknown confirmation: confirmation "
51400	""
51401	"Execution of the command on the analogue board failed."
51402	"The frontpanel could not be accessed by the analogue board."
51403	"The beeper did not sound."
51404	"The user skipped the FP-Beep test."
51405	"The user returned an unknown confirmation: confirmation"
51500	""
51501	"Execution of the command on the analogue board failed."
51502	"The frontpanel could not be accessed by the analogue board."
51503	"The discbar did not display properly."
51504	"The user skipped the discbar test."
51505	"The user returned an unknown confirmation: confirmation"
51600	""
51601	"Execution of the command on the analogue board failed."
51602	"The frontpanel could not be accessed by the analogue board."
51603	"The discbar dots did not display properly."
51604	"The user skipped the discbar dots test."
51605	"The user returned an unknown confirmation: confirmation"
51700	""
51701	"Execution of the command on the analogue board failed."
51702	"The frontpanel could not be accessed by the analogue board."
51703	"The VU grid did not display properly."
51704	"The user skipped the VU gridtest."
51705	"The user returned an unknown confirmation: confirmation"
51800	""
51801	"Execution of the command on the analogue board failed."
51802	"The frontpanel could not be accessed by the analogue board."
51803	"The frontpanel could not be dimmed."
51804	"The user skipped the FP-Dim test."
51805	"The user returned an unknown confirmation: confirmation"
51900	""
51901	"Execution of the command on the analogue board failed."
51902	"The frontpanel could not be accessed by the analogue board."
51903	"The frontpanel did not show segments blinking."
51904	"The user skipped the FP-blinking test."
51905	"The user returned an unknown confirmation: confirmation"
52000	""

Error Nr	Error String
52001	"Execution of the command on the analogue board failed."
52002	"The frontpanel could not be accessed by the analogue board."
52003	"The frontpanel did not show all segments lit."
52004	"The user skipped the FP-light all segments test."
52005	"The user returned an unknown confirmation: confirmation"
52200	""
52201	"Communication with Analogue Board fails."
52202	"Frontpanel can not be accessed by the Analogue Board."
52300	""
52301	"Communication with Analogue Board fails."
52302	"Frontpanel can not be accessed by the Analogue Board."
60000	""
60100	""
60101	"Basic Engine returned error number 0xerrornumber"
60102	"Parity error from Basic Engine to Serial"
60103	"Communication time-out error"
60104	"Unexpected response from Basic Engine"
60105	"Echo loop could not be closed"
60106	"Wrong echo pattern received"
60200	"Version: nr1.nr2.nr3"
60201	"Basic Engine returned error number 0xerrornumber"
60202	"Parity error from Basic Engine to Serial"
60203	"Communication time-out error"
60204	"Unexpected response from Basic Engine"
60205	"Front Panel failed."
60300	""
60301	"Basic-Engine time-out error"
60400	""
60401	"Basic Engine returned error number 0xerrornumber"
60402	"Parity error from Basic Engine to Serial"
60403	"Communication time-out error"
60404	"Unexpected response from Basic Engine"
60405	"Focus loop could not be closed"
60500	""
60501	"Basic Engine returned error number 0xerrornumber"
60502	"Parity error from Basic Engine to Serial"
60503	"Communication time-out error"
60504	"Unexpected response from Basic Engine"
60600	""
60601	"Basic Engine returned error number 0xerrornumber"
60602	"Parity error from Basic Engine to Serial"
60603	"Communication time-out error"
60604	"Unexpected response from Basic Engine"
60700	""
60701	"Basic Engine returned error number 0xerrornumber"
60702	"Parity error from Basic Engine to Serial"
60703	"Communication time-out error"
60704	"Unexpected response from Basic Engine"
60800	""
60801	"Basic Engine returned error number 0xerrornumber"
60802	"Parity error from Basic Engine to Serial"

Error Nr	Error String
60803	"Communication time-out error"
60804	"Unexpected response from Basic Engine"
60805	"Radial loop could not be closed"
60900	""
60901	"Basic Engine returned error number 0xerrornumber"
60902	"Parity error from Basic Engine to Serial"
60903	"Communication time-out error"
60904	"Unexpected response from Basic Engine"
61500	""
61501	"Basic Engine returned error number 0xerrornumber"
61502	"Parity error from Basic Engine to Serial"
61503	"Communication time-out error"
61504	"Unexpected response from Basic Engine"
61600	""
61601	"Basic Engine returned error number 0xerrornumber"
61602	"Parity error from Basic Engine to Serial"
61603	"Communication time-out error"
61604	"Unexpected response from Basic Engine"
61700	""
61701	"BE tray-in command failed"
61702	"BE read-TOC command failed"
61703	"BE VSM interrupt initialisation failed"
61704	"BE set irq command failed"
61705	"BE no disc or wrong disc inserted"
61706	"BE rec-pause command failed"
61707	"BE VSM BE out DMA initialisation failed"
61708	"BE VSM BE out initialisation failed"
61709	"BE VSM BE out DMA start failed"
61710	"BE VSM BE out start failed"
61711	"BE rec command failed"
61712	"BE VSM out underrun error occurred"
61713	"BE record complete interrupt not raised"
61714	"BE get irq command failed"
61715	"BE no interrupt was raised by BE"
61716	"BE VSM DMA out not finished"
61717	"BE stop command after writing failed"
61718	"BE VSM Sector processor initialisation failed"
61719	"BE VSM sector processor DMA initialisation failed"
61720	"BE VSM sector processor DMA start failed"
61721	"BE VSM sector processor start failed"
61722	"BE seek command failed"
61723	"BE VSM sector processor error occurred"
61724	"BE read timeout occurred"
61725	"BE stop command after reading failed"
61726	"BE difference found in data at disc sector 0xdiscsector"
61727	"This nucleus cannot be executed because the Self-Test failed"
61800	""
61801	"BE i2c initialisation failed"
61802	"This nucleus cannot be executed because the Self-Test failed"
61900	""
61901	"The SelfTest failed with result: 0xnr1 0xnr2 0xnr3"
61902	"Basic Engine returned error number 0xerrornumber"
61903	"Parity error from Basic Engine to Serial"
61904	"Communication time-out error"

Error Nr	Error String
61905	"Unexpected response from Basic Engine"
62000	""
62001	"Self-Test : errorstring1 Laser-Test : errorstring2 SpindleM-Test: errorstring3 SledgeM-Test: errorstring4 Focus-Test : errorstring5"
62100	"The forward sense level is 0xlevel"
62101	"Basic Engine returned error number 0xerrornumber"
62102	"Parity error from Basic Engine to Serial"
62103	"Communication time-out error"
62104	"Unexpected response from Basic Engine"
62200	""
62201	"The BE-self-diagnostic-spindle-motor-test failed"
62202	"Basic Engine returned error number 0xerrornumber"
62203	"Parity error from Basic Engine to Serial"
62204	"Communication time-out error"
62205	"Unexpected response from Basic Engine"
62300	""
62301	"The BE-focus-test failed"
62302	"Basic Engine returned error number 0xerrornumber"
62303	"Parity error from Basic Engine to Serial"
62304	"Communication time-out error"
62305	"Unexpected response from Basic Engine"
62400	""
62401	"The BE-self-diagnostic-sledge-motor-test failed"
62402	"Basic Engine returned error number 0xerrornumber"
62403	"Parity error from Basic Engine to Serial"
62404	"Communication time-out error"
62405	"Unexpected response from Basic Engine"
62500	""
62600	""
62700	"BE EEPROM address = address -> Byte value = 0xvalue"
62701	"Basic Engine returned error number 0xerrornumber"
62702	"Parity error from Basic Engine to Serial"
62703	"Communication time-out error"
62704	"Unexpected response from Basic Engine"
62705	"BE read EEPROM; invalid input"
62800	""
62801	"Basic Engine returned error number 0xerrornumber"
62802	"Parity error from Basic Engine to Serial"
62803	"Communication time-out error"
62804	"Unexpected response from Basic Engine"
62805	"BE write EEPROM; invalid input"
62900	""
62901	"Basic Engine returned error number 0xerrornumber"
62902	"Parity error from Basic Engine to Serial"
62903	"Communication time-out error"
62904	"Unexpected response from Basic Engine"
62905	"Radial loop could not be closed"
63000	""
63001	"Basic Engine returned error number 0xerrornumber"
63002	"Parity error from Basic Engine to Serial"
63003	"Communication time-out error"
63004	"Unexpected response from Basic Engine"

Error Nr	Error String
63100	" Number of times Tray went Open/Closed : nr1"" Total hours the CD laser was on : nr2"" Total hours the DVD laser was on : nr3"" Total hours the write laser was on : nr4"
63101	"Basic Engine returned error number 0xerrornumber"
63102	"Parity error from Basic Engine to Serial"
63103	"Communication time-out error"
63104	"Unexpected response from Basic Engine"
63200	""
63201	"Basic Engine returned error number 0xerrornumber"
63202	"Parity error from Basic Engine to Serial"
63203	"Communication time-out error"
63204	"Unexpected response from Basic Engine"
63300	Momentary errors (Byte 1 - Byte 7) : 0xb1 0xb2 0xb3 0xb4 0xb5 0xb6 0xb7 Cumulative errors (Byte 1 - Byte 7): : 0xb1 0xb2 0xb3 0xb4 0xb5 0xb6 0xb7 Fatal errors (Oldest - Youngest) : : 0xb1 0xb2 0xb3 0xb4 0xb5
63301	"Basic Engine returned error number 0xerrornumber"
63302	"Parity error from Basic Engine to Serial"
63303	"Communication time-out error"
63304	"Unexpected response from Basic Engine"
63400	""
63401	"Basic Engine returned error number 0xerrornumber"
63402	"Parity error from Basic Engine to Serial"
63403	"Communication time-out error"
63404	"Unexpected response from Basic Engine"
63500	""
63501	"Basic Engine returned error number 0xerrornumber"
63502	"Parity error from Basic Engine to Serial"
63503	"Communication time-out error"
63504	"Unexpected response from Basic Engine"
63505	"errorstring 0The basic engine will reject all player commands"
63900	""
63901	"Basic Engine returned error number 0xerrornumber"
63902	"Parity error from Basic Engine to Serial"
63903	"Communication time-out error"
63904	"Unexpected response from Basic Engine"
64000	"BE OPU number = opunumber"
64001	"Basic Engine returned error number 0xerrornumber"
64002	"Parity error from Basic Engine to Serial"
64003	"Communication time-out error"
64004	"Unexpected response from Basic Engine"
64100	"The data was successfully written on and read from a DVD disc"
64101	"The tray-in command failed"
64102	"The read-TOC command failed"
64103	"The VSM interrupt initialisation failed"
64104	"The set irq command failed"
64105	"No disc or wrong disc inserted"
64106	"The rec-pause command failed"
64107	"The VSM BE out DMA initialisation failed"
64108	"The VSM BE out initialisation failed"
64109	"The VSM BE out DMA start failed"
64110	"The VSM BE out start failed"
64111	"The rec command failed"

Error Nr	Error String
64112	"The VSM out underrun error occurred"
64113	"The record complete interrupt was not raised"
64114	"The get irq command failed"
64115	"There was no interrupt raised by BE"
64116	"The VSM DMA did not finished"
64117	"The stop command after writing failed"
64118	"The VSM Sector processor initialisation failed"
64119	"The VSM sector processor DMA initialisation failed"
64120	"The VSM sector processor DMA start failed"
64121	"The VSM sector processor start failed"
64122	"The seek command failed"
64123	"The VSM sector processor error occurred"
64124	"The read timeout occurred"
64125	"The stop command after reading failed"
64126	"There was a difference found in data at a specific disc sector"
64127	"The result of the self test contains errors"
64128	"An error interrupt was raised by BE"
64129	"The calibrate-record command failed"
64130	"To many retries"
64131	"BE update RAI command after writing failed"
64132	"BE find first recordable address command failed"
64133	"DVD+R disc is full"
64200	""
64201	"BE i2c initialisation failed"
64202	"This nucleus cannot be executed because the Self-Test failed"
70000	"Echo test OK"
70001	"Echo test returned wrong string."
70002	"Communication with Analogue Board fails"
70300	"SoftwareVersion"
70301	"Can not find segment in FLASH ROM on the Analogue Board"
70302	"Communication with Analogue Board fails"
70400	"HardwareVersion"
70401	"Can not find segment in FLASH ROM on the Analogue Board"
70402	"Communication with Analogue Board fails"
70500	"Clock adjusted OK"
70501	"Can not adjust the clock on the Analogue Board."
70502	"Wrong date/time text size."
70503	"Communication with Analogue Board fails"
70600	"Tuner accessibility test OK"
70601	"Can not access tuner on the Analogue Board."
70602	"Communication with Analogue Board fails"
70700	"Frequency download OK"
70701	"Wrong frequency table size."
70702	"Can not download the frequency table into the analogue NVRAM."
70703	"Can not download the frequency table into the analogue NVRAM."
70704	"Communication with Analogue Board fails"
70800	"Data slicer test OK"
70801	"Test of the Data slicer on the Analogue Board fails."
70802	"Communication with Analogue Board fails"
70900	"Sound Processor test OK"
70901	"Test of the Sound Processor on the Analogue Board fails."
70902	"Communication with Analogue Board fails"
71000	"AV Selector test OK"

Error Nr	Error String
71001	"Test of the AV Selector on the Analogue Board fails."
71002	"Communication with Analogue Board fails"
71100	"NVRAM test OK"
71101	"Test of the NVRAM on the Analogue Board fails."
71102	"Communication with Analogue Board fails"
71200	"Video routing on the Analogue Board OK"
71201	"Routing the video on the Analogue Board fails."
71202	"Invalid input."
71203	"Communication with Analogue Board fails"
71300	"Audio routing on the Analogue Board OK"
71301	"Routing the audio on the Analogue Board fails."
71302	"Invalid input."
71303	"Communication with Analogue Board fails"
71500	""
71501	"Invalid slash version, default slash version is set."
71502	"Setting the slash version on the Analogue Board fails."
71503	"Communication with Analogue Board fails"
71600	"ApplicationVersion"
71601	"Can not find segment in FLASH ROM on the Analogue Board"
71602	"Communication with Analogue Board fails"
71700	"DiagnosticsVersion"
71701	"Can not find segment in FLASH ROM on the Analogue Board"
71702	"Communication with Analogue Board fails"
71800	"DownloadVersion"
71801	"Can not find segment in FLASH ROM on the Analogue Board"
71802	"Communication with Analogue Board fails"
72300	""
72000	""
72001	"Adjusting BarGraphLevel failed"
72002	"Communication with Analogue Board fails"
72100	""
72101	"Storing clock correction failed"
72102	"Value out of range : default value stored "
72103	"Invalid input."
72104	"Communication with Analogue Board fails"
72200	""
72201	"Initialising the 1Hz signal on the Clock IC failed"
72202	"Communication with Analogue Board fails"
72301	"Clearing the NVRAM on the Analogue Board fails"
72302	"Communication with Analogue Board fails"
72400	"segment checksum is : checksum which is correct" for every segment
72401	"segment could not be found" or "segment checksum is : checksumC ,however it should be : checksumE" for every segment
72402	"Communication with Analogue Board fails"
72900	"Date received"
72901	"Data returned"
72902	"Communication on I2C-bus failed on the Analogue Board fails."
72903	"Communication with Analogue Board fails"
73000	""
73001	"Storing the external presets on the Analogue Board fails"
73002	"Communication with Analogue Board fails"
73100	"0xslashversion" where slashversion is the slash version read from the analogue board
73101	"Error while reading out slash version."

Error Nr	Error String
73102	"I2C Write error."
73103	"I2C Read error."
73104	"Communication with Analogue Board fails"
73200	""
73201	"Storing the Reference Voltage for the Tuner failed"
73202	"Invalid input."
73203	"Communication with Analogue Board fails"
80000	"The DVIO module is present in the system."
80001	"The DVIO module is not present in the system."
80100	"The DVIO module has been reset OK."
80101	"The DVIO module is not present in the system."
80102	"The DVIO module could not be reset."
80103	"Could not initialise I2C before Reset."
80200	"The accessibility of the DVIO module is OK."
80201	"The DVIO board is not present in this DVDR."
80202	"Could not initialise I2C."
80203	"Unable to reset the DVIO module."
80204	"Unable to receive the reset indication from the DVIO module."
80205	"Unable to send the configuration to the DVIO module."
80206	"Unable to download the chip ID to the DVIO module."
80207	"Unable to set the mode of the DVIO module to IDLE."
80208	"Software Error in function HandleStateAwaitingReply !!"
80209	"Maximal number of retries reached by HandleStateSending !!"
80210	"Maximal number of retries (NACKs) reached (HandleStateSending)"
80211	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times !!"
80212	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times !!"
80213	"We tried to receive an Ack for DVIO_MAX_RETRIES_ACK times!!"
80214	"VSM UART error timeout transmitting command"
80215	"VSM UART error timeout receiving reply"
80216	"VSM UART frame error occurred receiving from DVIO board"
80217	"VSM UART parity error occurred receiving from DVIO board"
80218	"The confirmation/indication from the DVIO module is invalid."
80300	"The accessibility of the DVIO module is OK."
80301	"The DVIO board is not present in this DVDR."
80302	"Could not initialise I2C."
80303	"Unable to reset the DVIO module."
80304	"Unable to receive the reset indication from the DVIO module."
80305	"Unable to send the configuration to the DVIO module."
80306	"Unable to download the chip ID to the DVIO module."
80307	"Unable to set the mode of the DVIO module to IDLE."
80308	"Software Error in function HandleStateAwaitingReply !!"
80309	"Maximal number of retries reached by HandleStateSending !!"
80310	"Maximal number of retries (NACKs) reached (HandleStateSending)"

Error Nr	Error String
80311	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times !!"
80312	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times !!"
80313	"We tried to receive an Ack for DVIO_MAX_RETRIES_ACK times!!"
80314	"VSM UART error timeout transmitting command"
80315	"VSM UART error timeout receiving reply"
80316	"VSM UART frame error occurred receiving from DVIO board"
80317	"VSM UART parity error occurred receiving from DVIO board"
80318	"The confirmation/indication from the DVIO module is invalid."
80400	"The accessibility of the DVIO module is OK."
80401	"The DVIO board is not present in this DVDR."
80402	"Could not initialise I2C."
80403	"Unable to reset the DVIO module."
80404	"Unable to receive the reset indication from the DVIO module."
80405	"Unable to send the configuration to the DVIO module."
80406	"Unable to download the chip ID to the DVIO module."
80407	"Unable to set the mode of the DVIO module to IDLE."
80408	"Software Error in function HandleStateAwaitingReply !!"
80409	"Maximal number of retries reached by HandleStateSending !!"
80410	"Maximal number of retries (NACKs) reached (HandleStateSending)"
80411	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times !!"
80412	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times !!"
80413	"We tried to receive an Ack for DVIO_MAX_RETRIES_ACK times!!"
80414	"VSM UART error timeout transmitting command"
80415	"VSM UART error timeout receiving reply"
80416	"VSM UART frame error occurred receiving from DVIO board"
80417	"VSM UART parity error occurred receiving from DVIO board"
80418	"The confirmation/indication from the DVIO module is invalid."
80500	""
80501	"The DVIO board is not present in this DVDR."
80502	"The I2C could not be initialised."
80503	"The DVIO module could not be reset."
80504	"Unable to receive the reset indication from the DVIO module."
80505	"Unable to send the configuration to the DVIO module."
80506	"Unable to download the chip ID to the DVIO module."
80507	"Unable to set the mode of the DVIO module to IDLE."
80508	"Software Error in HandleStateAwaitingReply function!"
80509	"Maximal number of retries reached by HandleStateSending!"
80510	"Maximal number of retries (NACK's) reached (HandleStateSending)"
80511	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times!"

Error Nr	Error String
80512	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times!"
80513	"We tried to receive an Acknowledge for DVIO_MAX_RETRIES_ACK times!"
80514	"VSM UART error timeout transmitting command"
80515	"VSM UART error timeout receiving reply"
80516	"VSM UART frame error occurred receiving from DVIO board"
80517	"VSM UART parity error occurred receiving from DVIO board"
80518	"The confirmation/indication from the DVIO module is invalid."
80519	"Setting the DVIO module in/out diagnostics mode failed"
80520	"Invalid input"
80521	"Getting the errors of the self-test failed"
80522	"Self-test failed"
80600	""
80601	"The DVIO board is not present in this DVDR."
80602	"The I2C could not be initialised."
80603	"The DVIO module could not be reset."
80604	"Unable to receive the reset indication from the DVIO module."
80605	"Unable to send the configuration to the DVIO module."
80606	"Unable to download the chip ID to the DVIO module."
80607	"Unable to set the mode of the DVIO module to IDLE."
80608	"Software Error in HandleStateAwaitingReply function!"
80609	"Maximal number of retries reached by HandleStateSending!"
80610	"Maximal number of retries (NACK's) reached "(HandleStateSending)"
80611	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times!"
80612	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times!"
80613	"We tried to receive an Acknowledge for DVIO_MAX_RETRIES_ACK times!"
80614	"VSM UART error timeout transmitting command"
80615	"VSM UART error timeout receiving reply"
80616	"VSM UART frame error occurred receiving from DVIO board"
80617	"VSM UART parity error occurred receiving from DVIO board"
80618	"The confirmation/indication from the DVIO module is invalid."
80619	"Setting the DVIO module in/out diagnostics mode failed"
80700	""
80701	"The DVIO board is not present in this DVDR."
80702	"The I2C could not be initialised."
80703	"The DVIO module could not be reset."
80704	"Unable to receive the reset indication from the DVIO module."
80705	"Unable to send the configuration to the DVIO module."
80706	"Unable to download the chip ID to the DVIO module."
80707	"Unable to set the mode of the DVIO module to IDLE."
80708	"Software Error in HandleStateAwaitingReply function!"

Error Nr	Error String
80709	"Maximal number of retries reached by HandleStateSending!"
80710	"Maximal number of retries (NACK's) reached "(HandleStateSending)"
80711	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times!"
80712	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times!"
80713	"We tried to receive an Acknowledge for DVIO_MAX_RETRIES_ACK times!"
80714	"VSM UART error timeout transmitting command"
80715	"VSM UART error timeout receiving reply"
80716	"VSM UART frame error occurred receiving from DVIO board"
80717	"VSM UART parity error occurred receiving from DVIO board"
80718	"The confirmation/indication from the DVIO module is invalid."
80719	"Setting the DVIO module in/out diagnostics mode failed"
90121	"Error: audio data in host memory contains wrong frequency: frequency Hz"
90122	"Error: audio data in host memory contains silence!"
90123	"There is no correct audio frame in the buffer"
90124	"The audio frame has an illegal version bit"
90125	"The audio frame has an illegal bitrate-index"
90126	"The audio frame has an illegal sampling rate"
90127	"The CRC of the audio frame is wrong"
90128	"The audio frame is not MPEG-I layer II !"
90129	"Error cannot de-mute DAC on analogue board"
90200	""
90201	"Initialisation of I2C failed"
90202	"Initialisation of VIP and EMPIRE failed"
90203	"Initialisation of PLL / Link failed."
90204	"Next descriptor address set wrong."
90205	"Turning on the colourbar failed"
90206	"No I2C communication possible to start video encoder."
90207	"Starting the video encoder failed."
90208	"Transfer of data from video encoder to VSM failed."
90209	"Stopping the encoder failed."
90210	"Turning off the colourbar failed."
90211	"Cannot initialize hostdecoder parallel input"
90212	"Cannot initialise VSM AV-out DMA port"
90213	"Cannot initialise VSM AV-out port"
90214	"Cannot start VSM AV-out DMA port"
90215	"Cannot start VSM AV-out port"
90216	"Transfer of data from VSM to host decoder failed."
90217	"VSM and Hostdec memory do not match (compared after transfer)"
90218	"Decoding of the video data in the hostdecoder memory failed"
90219	"The data in the hostdecoder is not equal to a colourbar"
90220	"The video encoder did not return the Group Of Picture count."
90221	"The video encoder did not receive data from the VIP."
90223	"Initialisation of VIP and EMPRESS failed"
90224	"The video encoder did not return the current status."

Error Nr	Error String
90225	"The video encoder timed out in BUSY mode. (no VIP input)"
90226	"The video encoder did not return the current bi-rate."
90227	"The video encoder did not switch to ENCODING mode."
90228	"The video encoder could not start from STOP/IDLE mode."
90229	"The video encoder did not switch from IDLE to STOP mode."
90300	""
90301	"Initialisation of I2C failed"
90302	"I2C communication to VIP failed"
90303	"Initialisation of VIP failed"
90304	"Generation of Close Caption data failed"
90305	"VIP not locked to video signal"
90306	"Initialisation of VBI Extractor failed"
90307	"No CC data received"
90308	"Closed Caption data overrun"
90309	"Closed Caption data does not match"
90310	"Switch off ColourBar failed"
90400	""
90401	"Initialisation of I2C failed"
90402	"Initialisation of VIP and EMPIRE failed"
90403	"Initialisation of PLL / Link failed."
90404	"Next descriptor address set wrong."
90405	"Turning on the colourbar failed"
90406	"No I2C communication possible to start video encoder."
90407	"Starting the video encoder failed."
90408	"Transfer of data from video encoder to VSM failed."
90409	"Stopping the encoder failed."
90410	"Turning off the colourbar failed."
90411	"Cannot initialize hostdecoder parallel input"
90412	"Cannot initialise VSM AV-out DMA port"
90413	"Cannot initialise VSM AV-out port"
90414	"Cannot start VSM AV-out DMA port"
90415	"Cannot start VSM AV-out port"
90416	"Transfer of data from VSM to host decoder failed."
90417	"VSM and Hostdec memory do not match (compared after transfer)"
90418	"Decoding of the video data in the hostdecoder memory failed"
90419	"The data in the hostdecoder is not equal to a colourbar"
90420	"The video encoder did not return the Group Of Picture count."
90421	"The video encoder did not receive data from the VIP."
90422	"Execution of the command on the analogue board failed."
90423	"Initialisation of VIP and EMPRESS failed"
90424	"The video encoder did not return the current status."
90425	"The video encoder timed out in BUSY mode. (no VIP input)"
90426	"The video encoder did not return the current bi-rate."
90427	"The video encoder did not switch to ENCODING mode."
90428	"The video encoder could not start from STOP/IDLE mode."

Error Nr	Error String
90429	"The video encoder did not switch from IDLE to STOP mode."
90500	""
90501	"Initialisation of I2C failed"
90502	"I2C communication to VIP failed"
90503	"Initialisation of VIP failed"
90504	"Generation of Close Caption data failed"
90505	"VIP not locked to video signal"
90506	"Initialisation of VBI Extractor failed"
90507	"No CC data received"
90508	"Closed Caption data overrun"
90509	"Closed Caption data does not match"
90510	"Switch off ColourBar failed"
90511	"Execution of the command on the analogue board failed."
90600	""
90601	"Initialisation of I2C failed"
90602	"Initialisation of VIP and EMPIRE failed"
90603	"Initialisation of PLL / Link failed."
90604	"Next descriptor address set wrong."
90605	"Turning on the colourbar failed"
90606	"No I2C communication possible to start video encoder."
90607	"Starting the video encoder failed."
90608	"Transfer of data from video encoder to VSM failed."
90609	"Stopping the encoder failed."
90610	"Turning off the colourbar failed."
90611	"Cannot initialize hostdecoder parallel input"
90612	"Cannot initialise VSM AV-out DMA port"
90613	"Cannot initialise VSM AV-out port"
90614	"Cannot start VSM AV-out DMA port"
90615	"Cannot start VSM AV-out port"
90616	"Transfer of data from VSM to host decoder failed."
90617	"VSM and Hostdec memory do not match (compared after transfer)"
90618	"Decoding of the video data in the hostdecoder memory failed"
90619	"The data in the hostdecoder is not equal to a colourbar"
90620	"The video encoder did not return the Group Of Picture count."
90621	"The video encoder did not receive data from the VIP."
90622	"Execution of the command on the analogue board failed."
90623	"Initialisation of VIP and EMPRESS failed"
90624	"The video encoder did not return the current status."
90625	"The video encoder timed out in BUSY mode. (no VIP input)"
90626	"The video encoder did not return the current bi-rate."
90627	"The video encoder did not switch to ENCODING mode."
90628	"The video encoder could not start from STOP/IDLE mode."
90629	"The video encoder did not switch from IDLE to STOP mode."
90700	""
90701	"Initialisation of I2C failed"
90702	"I2C communication to VIP failed"
90703	"Initialisation of VIP failed"
90704	"Generation of Close Caption data failed"

Error Nr	Error String
90705	"VIP not locked to video signal"
90706	"Initialisation of VBI Extractor failed"
90707	"No CC data received"
90708	"Closed Caption data overrun"
90709	"Closed Caption data does not match"
90710	"Switch off ColourBar failed"
90711	"Execution of the command on the analogue board failed."
90800	""
90801	"Error routing the audio back to the digital board."
90802	"Error cannot initialise I2C"
90803	"Error cannot initialise VIP"
90804	"Error cannot set ADC enable pin"
90805	"Error cannot set VSM audio clock"
90806	"Error preparing the 12kHz audio-sine"
90807	"Error cannot initialise audio encoder"
90808	"Error cannot initialise VSM audio in port"
90809	"Error cannot initialise VSM audio in DMA port"
90810	"Error cannot initialise VSM audio out DMA port"
90811	"Error cannot initialise audio VSM out port"
90812	"Error cannot initialise host decoder audio in"
90813	"Error loop audio user/dealer cannot start audio encoder"
90814	"Error cannot start VSM audio in DMA port"
90815	"Error starting the 12kHz audio-sine"
90816	"Error transfer data from audio encoder to VSM"
90817	"Error cannot start VSM AV out DMA port"
90818	"Error cannot start VSM AV out port"
90819	"Error transfer data from VSM to host decoder"
90820	"Error: audio data in host memory and VSM memory differ"
90821	"Error: audio data in host memory contains wrong frequency: frequency Hz"
90822	"Error: audio data in host memory contains silence!"
90823	"There is no correct audio frame in the buffer"
90824	"The audio frame has an illegal version bit"
90825	"The audio frame has an illegal bitrate-index"
90826	"The audio frame has an illegal sampling rate"
90827	"The CRC of the audio frame is wrong"
90828	"The audio frame is not MPEG-I layer II !"
90829	"Error cannot de-mute DAC on analogue board"
90900	""
90901	"Error routing the audio back to the digital board."
90902	"Error cannot initialise I2C"
90903	"Error cannot initialise VIP"
90904	"Error cannot set ADC enable pin"
90905	"Error cannot set VSM audio clock"
90906	"Error preparing the 12kHz audio-sine"
90907	"Error cannot initialise audio encoder"
90908	"Error cannot initialise VSM audio in port"
90909	"Error cannot initialise VSM audio in DMA port"
90910	"Error cannot initialise VSM audio out DMA port"
90911	"Error cannot initialise audio VSM out port"
90912	"Error cannot initialise host decoder audio in"
90913	"Error loop audio user/dealer cannot start audio encoder"
90914	"Error cannot start VSM audio in DMA port"
90915	"Error starting the 12kHz audio-sine"
90916	"Error transfer data from audio encoder to VSM"
90917	"Error cannot start VSM AV out DMA port"
90918	"Error cannot start VSM AV out port"

Error Nr	Error String
90919	"Error transfer data from VSM to host decoder"
90920	"Error: audio data in host memory and VSM memory differ"
90921	"Error: audio data in host memory contains wrong frequency: frequency Hz"
90922	"Error: audio data in host memory contains silence!"
90923	"There is no correct audio frame in the buffer"
90924	"The audio frame has an illegal version bit"
90925	"The audio frame has an illegal bitrate-index"
90926	"The audio frame has an illegal sampling rate"
90927	"The CRC of the audio frame is wrong"
90928	"The audio frame is not MPEG-I layer II !"
90929	"Error cannot de-mute DAC on analogue board"
140000	""
140001	"I2C to Clock failed" or "I2C initialisation failed"
140100	""
140101	"I2C to Clock failed" or "I2C initialisation failed"
141200	""
141201	"Progressive Scan Board I2C bus busy"
141211	"Progressive Scan Board I2C FLI2200 bus busy"
141212	"Progressive Scan Board I2C FLI2200 read access time-out"
141213	"Progressive Scan Board I2C FLI2200 no read acknowledge"
141214	"Progressive Scan Board I2C FLI2200 read failed"
141215	"Progressive Scan Board I2C FLI2200 write access time-out"
141216	"Progressive Scan Board I2C FLI2200 no write acknowledge"
141217	"Progressive Scan Board I2C FLI2200 write failed"
141218	"Progressive Scan Board I2C FLI2200 failed"
141221	"Progressive Scan Board I2C AD7196 bus busy"
141222	"Progressive Scan Board I2C AD7196 read access time-out"
141223	"Progressive Scan Board I2C AD7196 no read acknowledge"
141224	"Progressive Scan Board I2C AD7196 read failed"
141225	"Progressive Scan Board I2C AD7196 write access time-out"
141226	"Progressive Scan Board I2C AD7196 no write acknowledge"
141227	"Progressive Scan Board I2C AD7196 write failed"
141228	"Progressive Scan Board I2C AD7196 failed"
141300	""
141301	"Progressive Scan Route Enable failed"
141302	"Generating test image in Hostdecoder failed"
141400	""
141401	"Progressive Scan Route Disable failed"
141402	"Turning off test image in Hostdecoder failed"
141500	""
141501	"Progressive Scan Board I2C failed"
141600	""
141601	"Progressive Scan Board I2C failed"

Error Codes Nucleus 805

Error Code	Description	Bus	Components
0x00	No Error	-	-
0x11	No link register access	PA[8:0] PAD[7:0]	Link uP
0x12	No link register access or link reset failed	PA[8:0] PAD[7:0] 1394_RSTn	Link uP FPGA
0x13	No link register access or link reset failed	PA[8:0] PAD[7:0] 1394_RSTn	Link uP FPGA
0x14	No link register access	PA[8:0] PAD[7:0]	Link uP
0x15	No link register access	PA[8:0] PAD[7:0]	Link uP
0x16	No link register access	PA[8:0] PAD[7:0]	Link uP
0x17	Link reset failed	1394_RSTn	Link FPGA
0x18	Link reset failed	1394_RSTn	Link FPGA
0x19	Cycle timer in link chip does not increment	-	Link
0x1A	Interrupt from Link chip does not go low at 8051	LINK_INTn PINT1n	Link FPGA uP
0x1B	Interrupt from Link chip does not go high at 8051	LINK_INTn PINT1n	Link FPGA uP
0x1C	Submission of read request to Phy timed out	Bus_LP	Phy
0x1D	Reception of read data from Phy timed out	Bus_LP	Phy
0x1E	Inproper Phy read address was received from Phy	Bus_LP	Phy
0x1F	Phy write timed out	Bus_LP	Phy
0x20	Could not read reg #2 of Phy	Bus_LP	Phy
0x21	Could not write 0xaa to reg #1 of phy	Bus_LP	Phy
0x22	Could not write 0x55 to reg #1 of phy	Bus_LP	Phy
0x23	Read incorrect default gapcount from Phy	Bus_LP	Phy
0x24	Read incorrect updated gapcount from Phy	Bus_LP	Phy
0x25	Read incorrect gapcount from Phy after reset	F117 F173	Phy OptoPR
0x26	Expecting no 1394 connectivity; while Phy.CNA indicates connection	F108 PHY_CNA Bus_PC	Phy OptoCNA FPGA
0x27	Expecting 1394 connectivity; while Phy.CNA indicates no connection	F108 PHY_CNA Bus_PC	Phy OptoCNA FPGA
0x28	Expected port1 unconnected; but found connected	Bus_PC	Phy
0x29	Phy read retry limit exceeded	-	Phy
0x2A	Expected port2 unconnected; but found connected	-	Phy
0x2B	Expected port3 unconnected; but found connected	-	Phy
0x2C	Expected 0x1 in lower nibble of Phy reg 7	-	Phy
0x2D	Expected CPS and C bit set in Phy reg 6	-	Phy
0x30	Internal ram problem in address lines	Internal in uP	P89C51RD2
0x31	Internal ram problem in data lines	Internal in uP	P89C51RD2
0x32	External ram problem in address lines	PA[15:0] PAD[7:0] PRDn PWRn	P89C51RD2/CY62256/74HC573
0x33	External ram problem in data lines	PAD[7:0]	P89C51RD2/CY62256/74HC573
0x34	Problem accessing flex scratch register	PAD[7:0]	EPF6024
0x36	INT0n stuck at '0'	PINT0n	EPF6024 / P89C51RD2
0x37	INT0n stuck at '1'	PINT1n	EPF6024 / P89C51RD2
0x38	Problem accessing NW701 registers	HAD[7:0] DV_Asn/RWn/DSUn/DSLn	EPF6024 / NW701
0x39	Reset line to NW701 not functioning	DV_RSTn	EPF6024 / NW701
0x3A	Checksum of codespace 0x0000-0xfbff is not 0x00	Incorrectly programmed	P89C51RD2
0xF4	PHY chip not responding	-	Phy
0xF5	LINK chip not responding	-	Phy

5.5 Loop tests

The following loops can be distinguished:

- Loops performed on the digital board only
- User Dealer loops performed on the digital and analogue board
- System loops performed via an external connection: outputs are looped back to the inputs.

5.5.1 Nucleus 900: Digital Audio Loop

This nucleus tests the audio path through the digital board

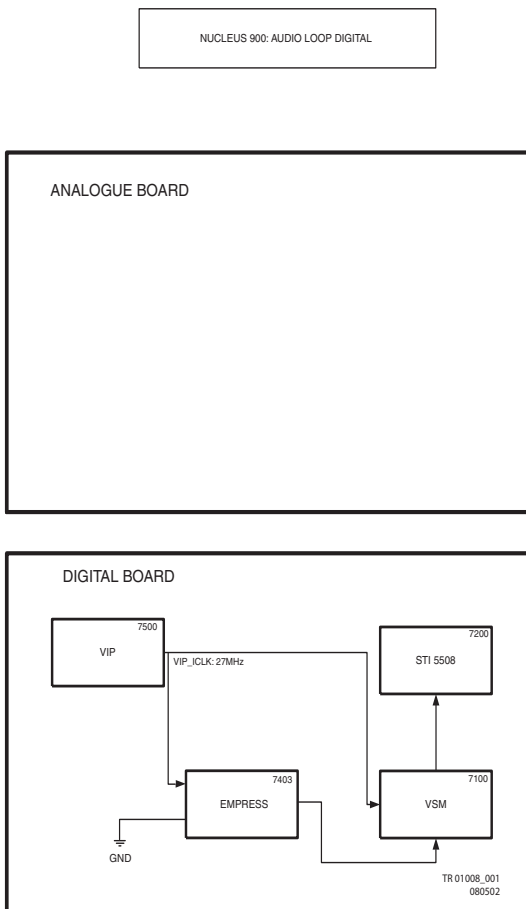


Figure 5-9

5.5.2 Nucleus 901: Audio User Dealer Loop

This Nucleus is only possible in NAFTA sets.

A PCM audio sine of 12kHz is generated in the Host Decoder for a while and sent to the analogue board. The signal coming from the analogue board is encoded again and sent to the memory of the host decoder for comparison. This nucleus tests the components on the audio signal path:

- Host decoder
- Flex connection between connector 1602 (digital board) and connector 1900 (analogue board)
- DAC
- Op-amp
- Scart switch IC
- ADC
- Audio Encoder
- VIP
- VSM

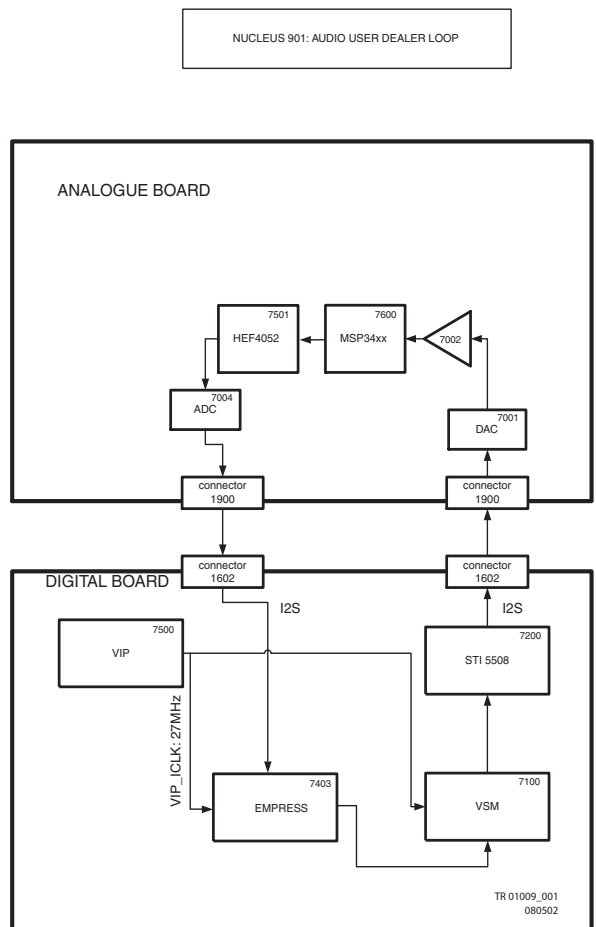


Figure 5-10

5.5.3 Nucleus 902: Digital Video Loop

A colourbar generated in the host decoder is looped through the VIP, Empire, and VSM and checked again in the host decoder. The following components are tested on the video signal path:

- VIP
- Empire
- VSM
- Host decoder

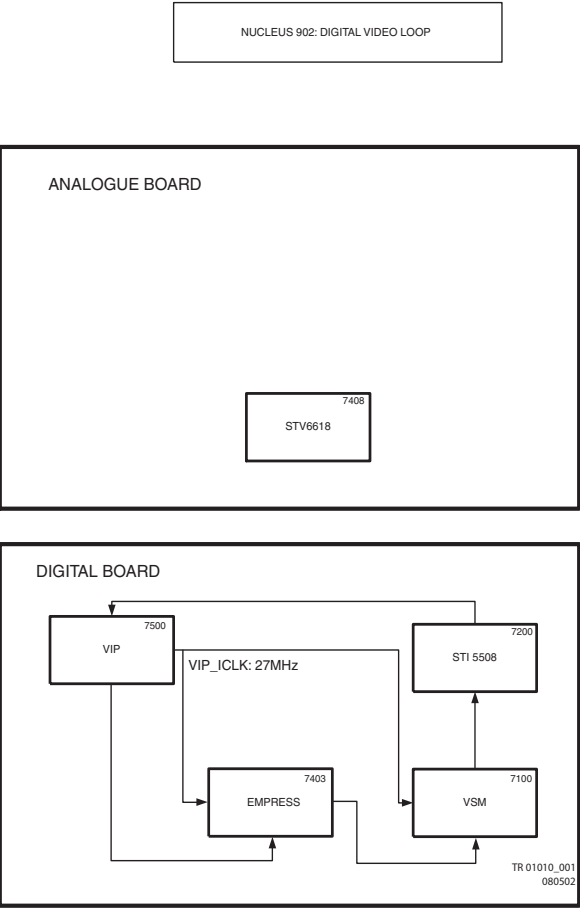


Figure 5-11

5.5.4 Nucleus 903: Digital Video VBI Loop

Nucleus for testing the components on the video VBI signal path:

- The VIP
- The VSM
- The Host Decoder

This is done by using the internal test signal source (digital board only)

Remark: this test is only successful if nucleus 121 is carried out first.

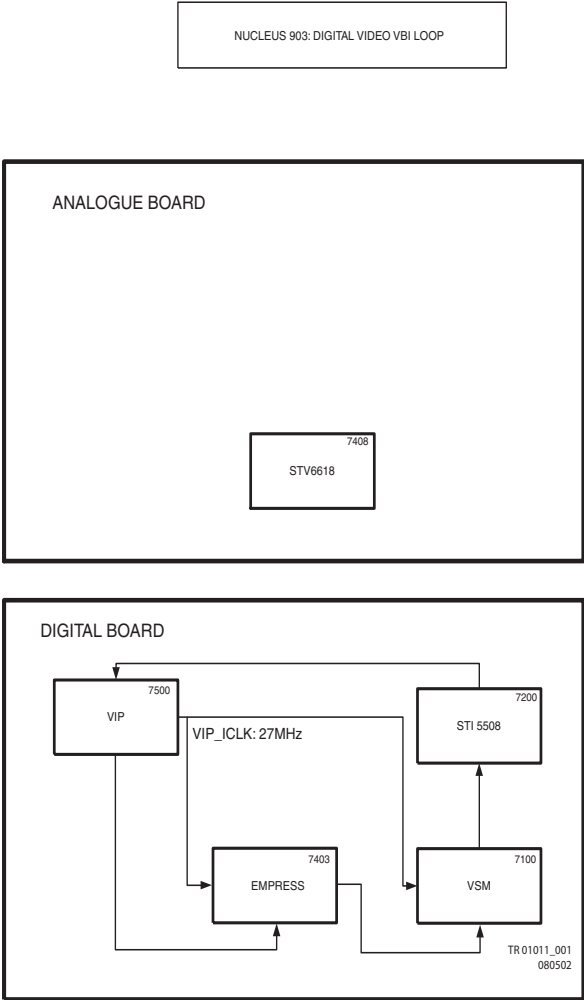


Figure 5-12

5.5.5 Nucleus 904: System Video Loop

Nucleus for testing the components on the video signal system path:

- The VIP
- The video encoder
- The VSM
- The host decoder
- The analogue board

On the analogue board the video signal will be routed to the SCART (EUROPE) or CINCH (NAFTA). There it will be looped back externally by means of the proper cable

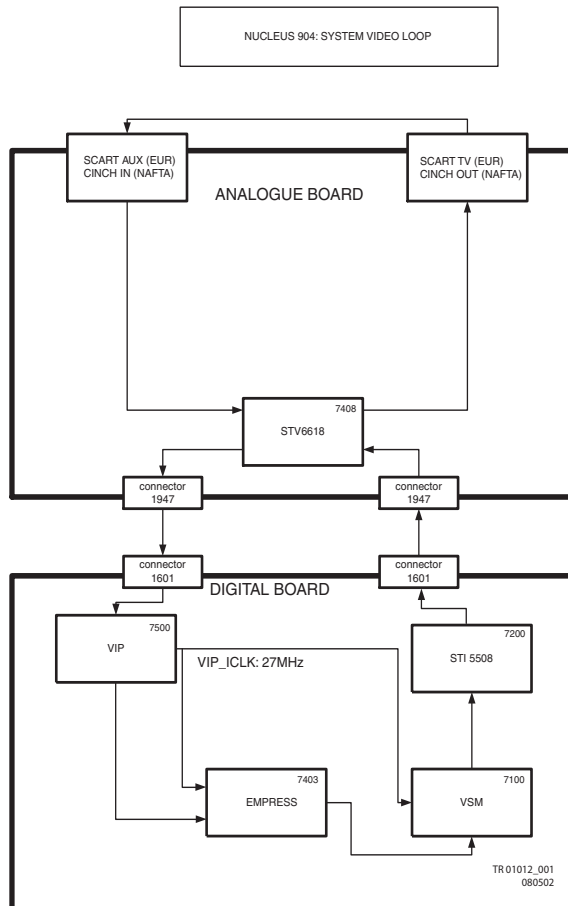


Figure 5-13

5.5.6 Nucleus 905: System Video VBI Loop

This nucleus tests the components on the video signal path:

- The VIP
- The VSM
- The Host Decoder

The video CVBS signal is routed to the output of the analogue board where it will be looped back by means of an external cable

Remark: this test is only successful if nucleus 121 is carried out first.

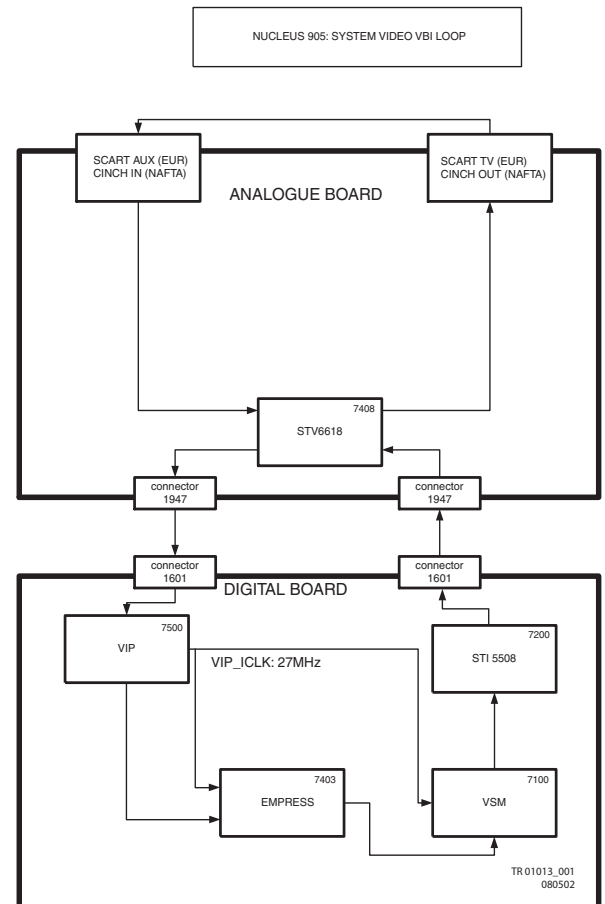


Figure 5-14

5.5.7 Nucleus 906: Video User Dealer Loop

Nucleus for testing the components on the video signal system path:

- The VIP
- The video encoder
- The VSM
- The host decoder
- The analogue board

On the analogue board, the video signal is internally routed back to the digital board.

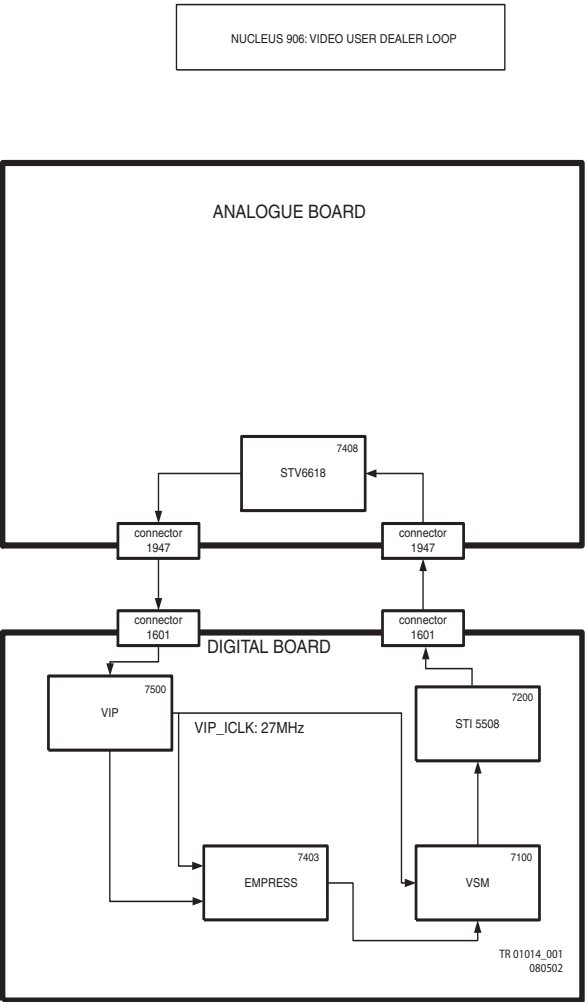


Figure 5-15

5.5.8 Nucleus 907: Video VBI User Dealer Loop

This nucleus tests the components on the video VBI signal path:

- The VIP
- The VSM
- The Host Decoder

The signal is routed back internally on the analogue board
Remark: this test is only successful if nucleus 121 is carried out first.

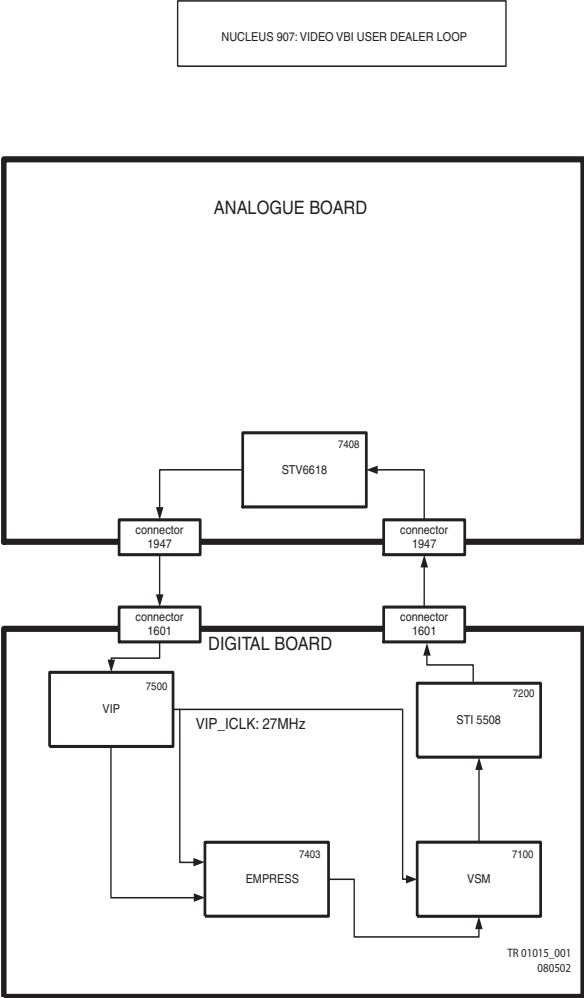


Figure 5-16

5.5.9 Nucleus 908: System Audio Loop Scart (Europe)

Nucleus for testing the components on the audio signal path:

- The hostdecoder
- The analogue board
- The audio encoder
- The VSM

On the analogue board, audio is passed to the SCART connector, where a SCART cable needs to be used to loop back the audio signal to the digital board

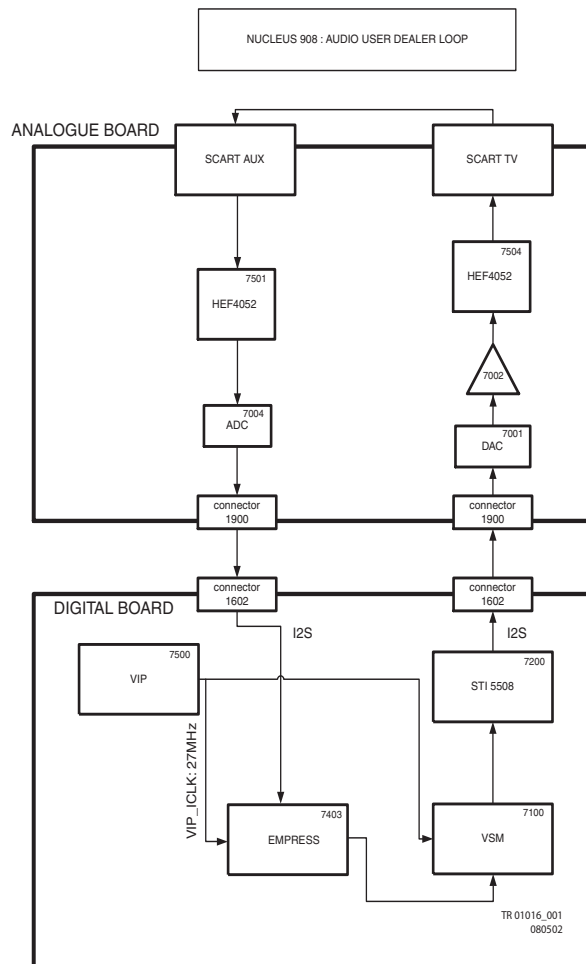


Figure 5-17

5.5.10 Nucleus 909: System Audio Loop CINCH (Nafta)

Nucleus for testing the components on the audio signal path:

- The hostdecoder
- The analogue board
- The audio encoder
- The VSM

A parameter has to be specified to select the appropriate output routing. This parameter is identical to nucleus 713.

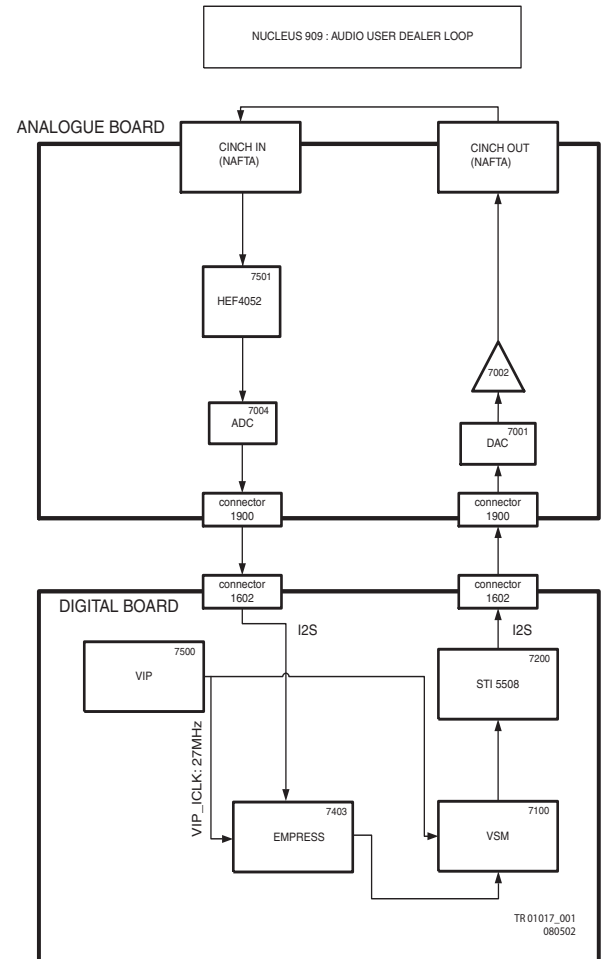


Figure 5-18

5.5.11 Nucleus 910: DVIO Video Input

Nucleus for testing the components on the video signal path:

- The DVIO board
- The VIP
- The video encoder
- The VSM
- The host decoder

Note :This Test is not valid for Nafta in DVDR-Lead. For Europe the sound will be available on scart 2.

5.5.12 Nucleus 911: DVIO Video VIP

Nucleus for testing the components on the video signal system path:

- The host decoder
- The analogue board
- The VIP

On the analogue board the video signal will be routed according to the parameter. There it will be looped back externally by means of the proper cable.

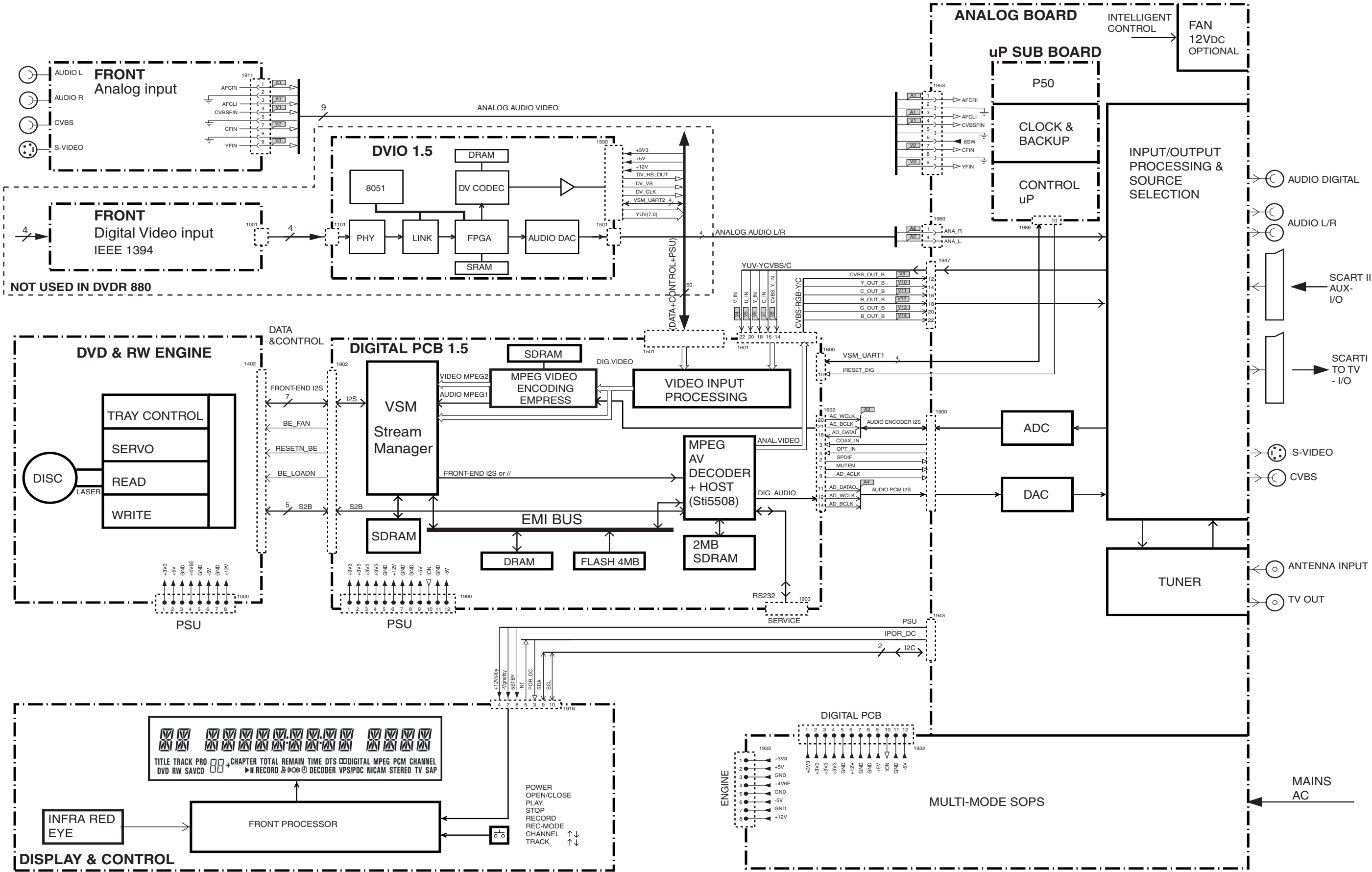
The correct Routing path has to be selected by a parameter:

Analog board Version	Selectable parameter	Internal call to nucleus 712
01	1	712.21
11	1	712.21
31	2	712.17
31	3	721.18
31	3	712.19
41	2	712.17
41	3	712.18
41	4	712.19
41	5	712.20
71	4	712.19

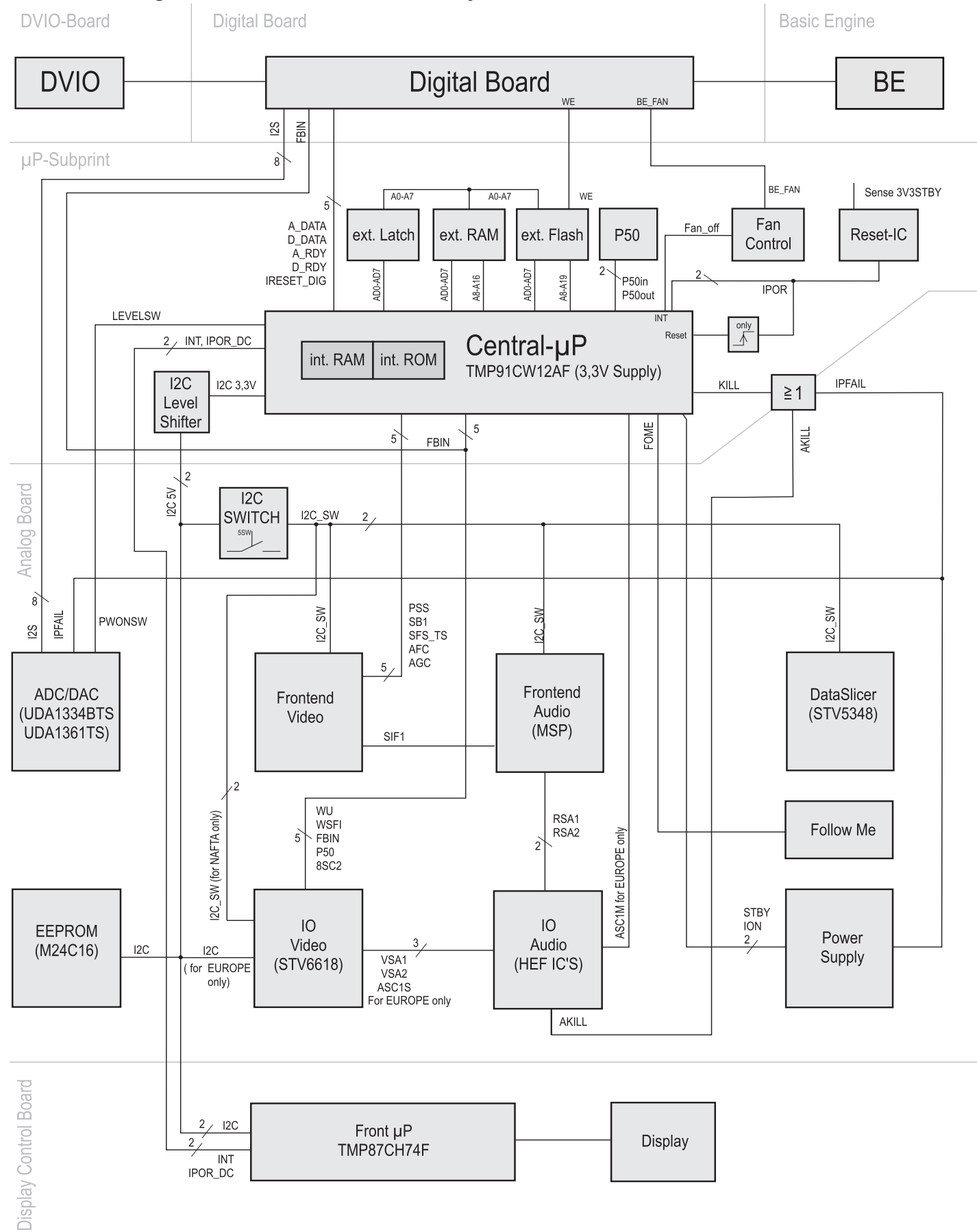
Remark: Nucleus 704 gives the analog board version

6. Block Diagrams, Waveforms, Wiring Diagram.

BLOCK DIAGRAM DVDR880, DVDR890 EURO

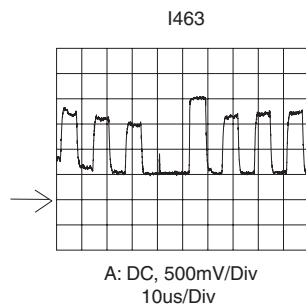
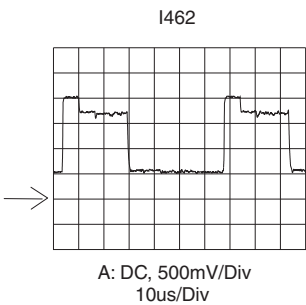
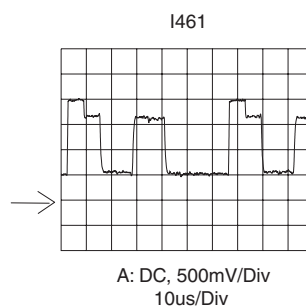
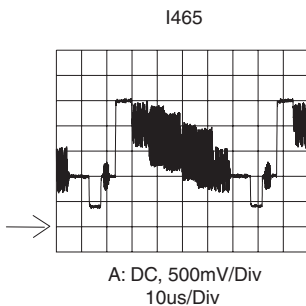
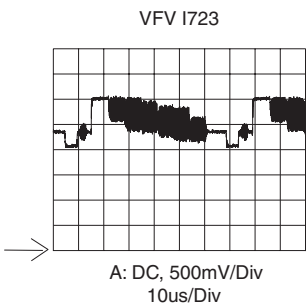
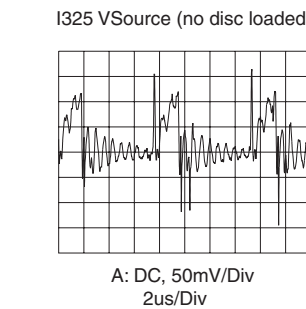
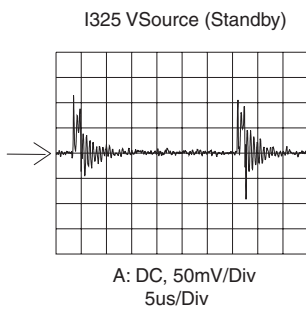
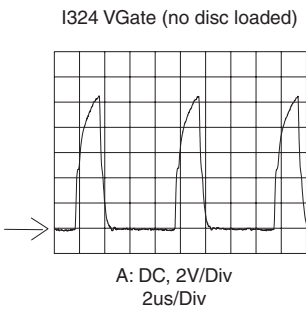
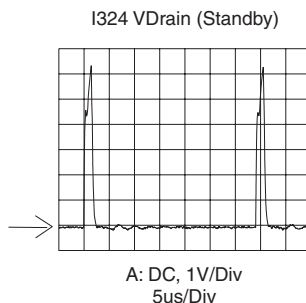
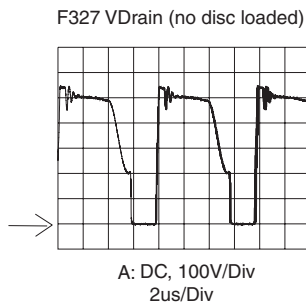
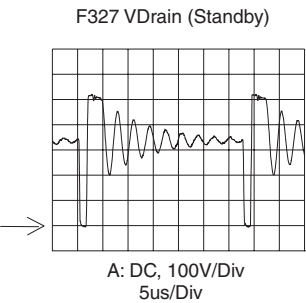


Blockdiagram Control Lines and Bus Systems

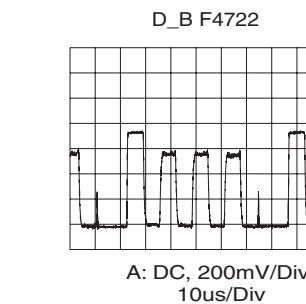
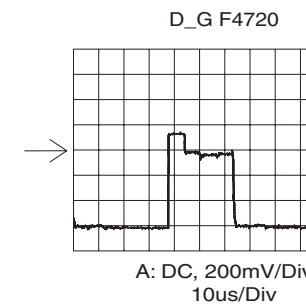
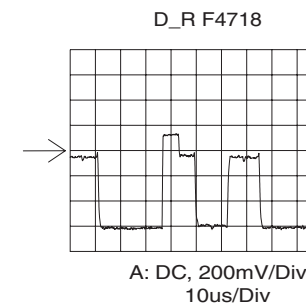
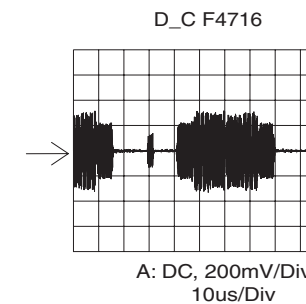
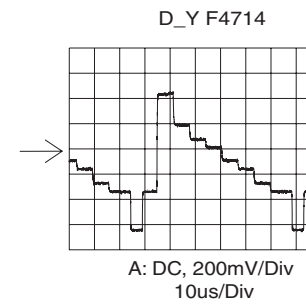
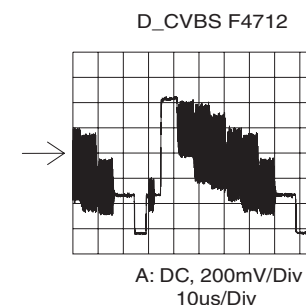
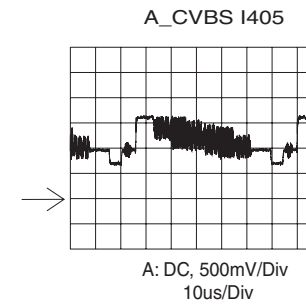


Waveforms

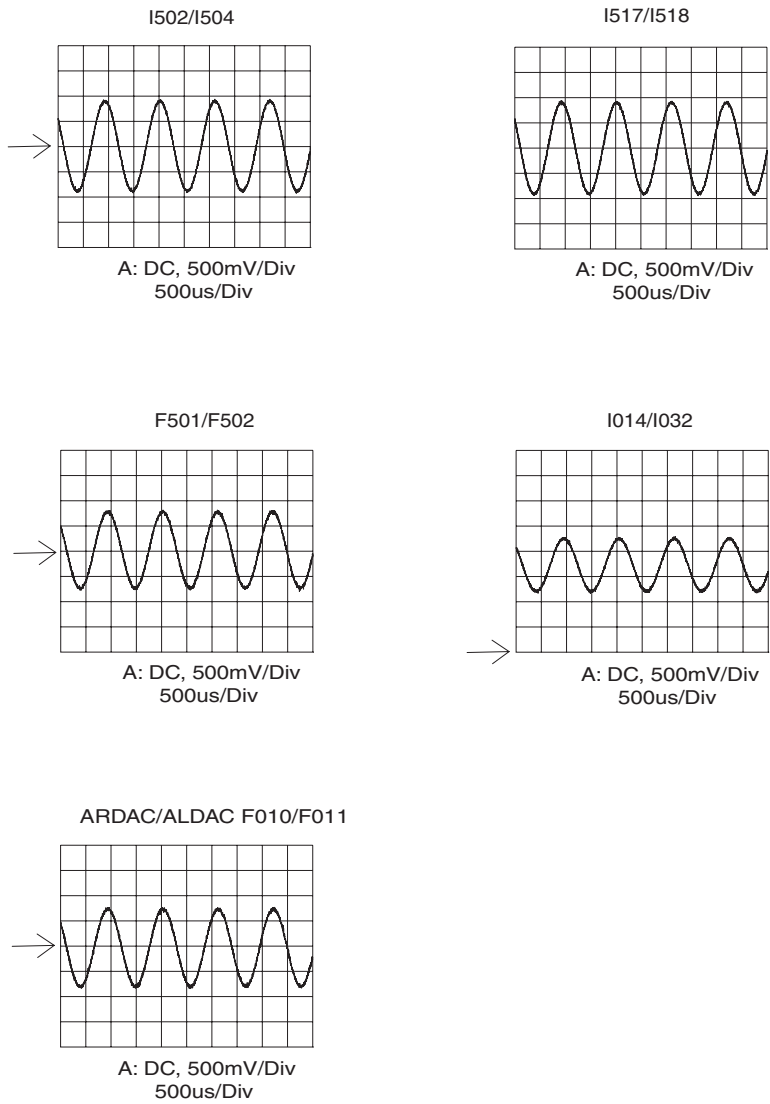
Waveforms Analog Board, uPC Sub PWB



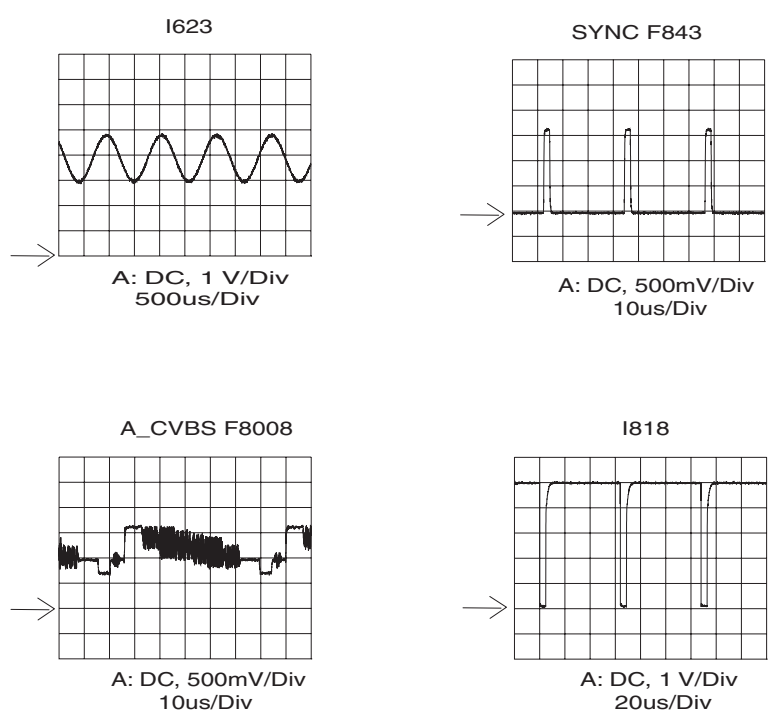
Waveforms Analog Board, uPC Sub PWB



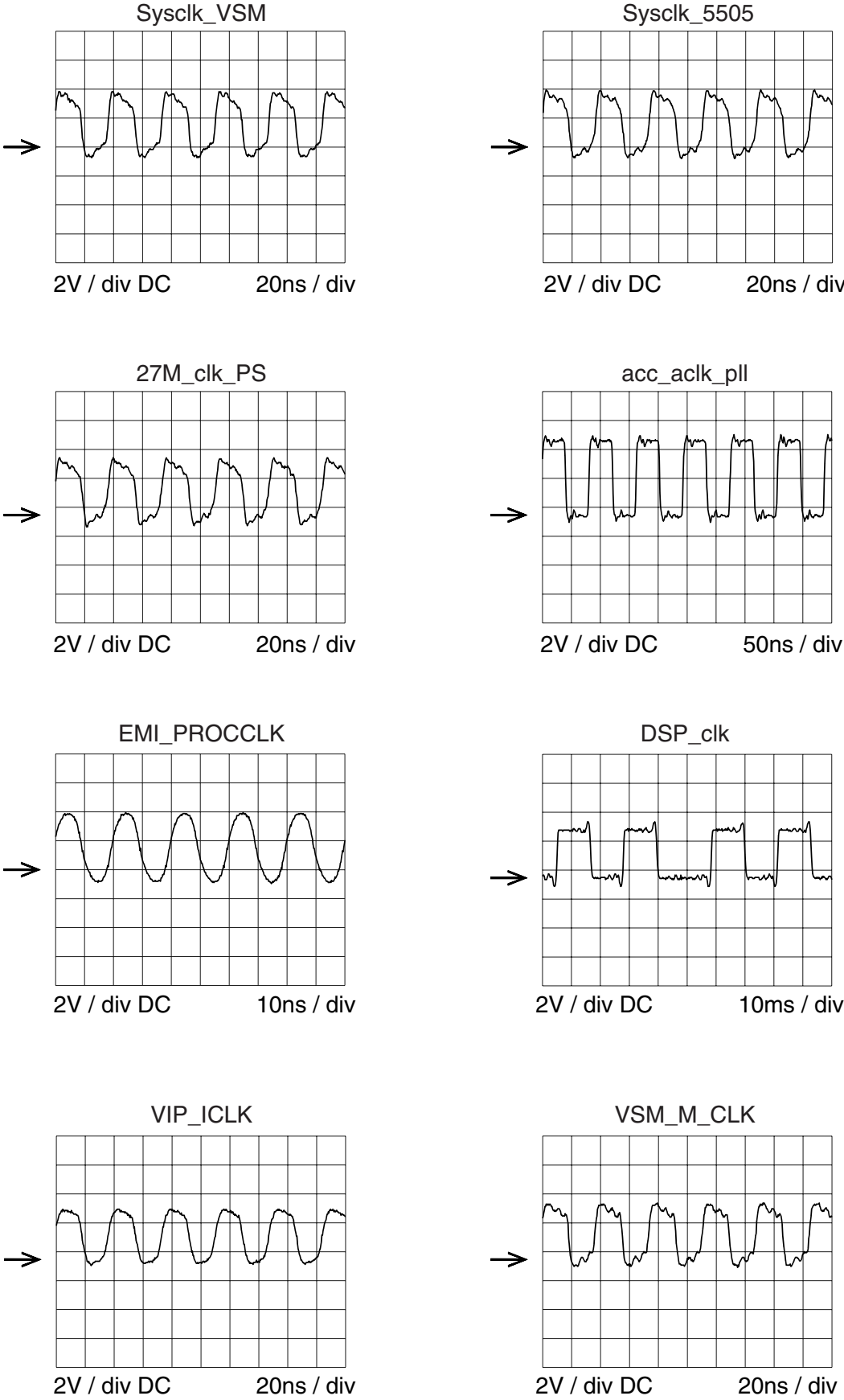
Waveforms Analog Board, uPC Sub PWB



Waveforms Analog Board, uPC Sub PWB



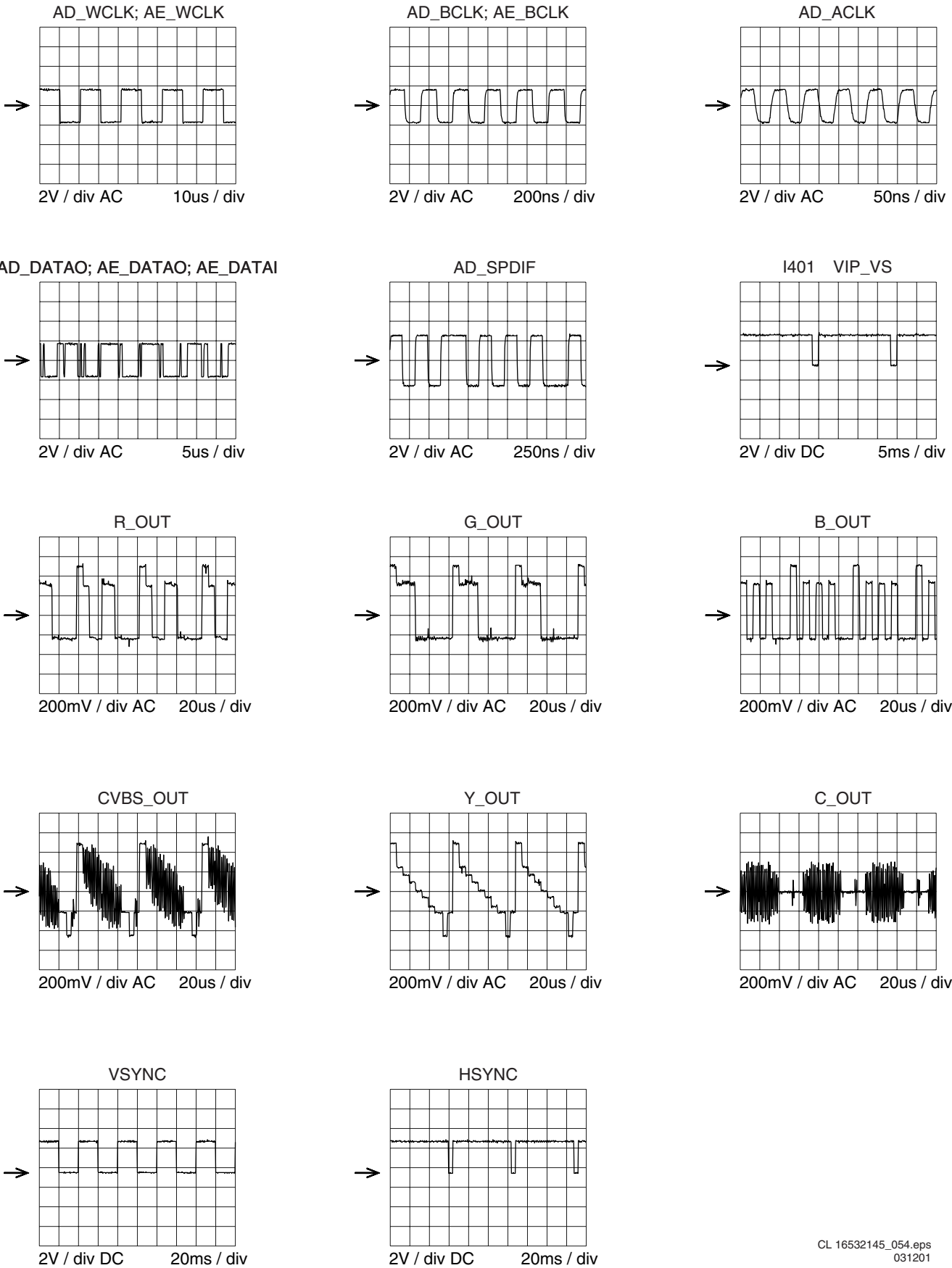
Waveforms Digital Board



CL 16532145_053.eps
031201

Figure 6-1

Waveforms Digital Board



CL 16532145_054.eps
031201

Figure 6-2

Waveforms Digital Board

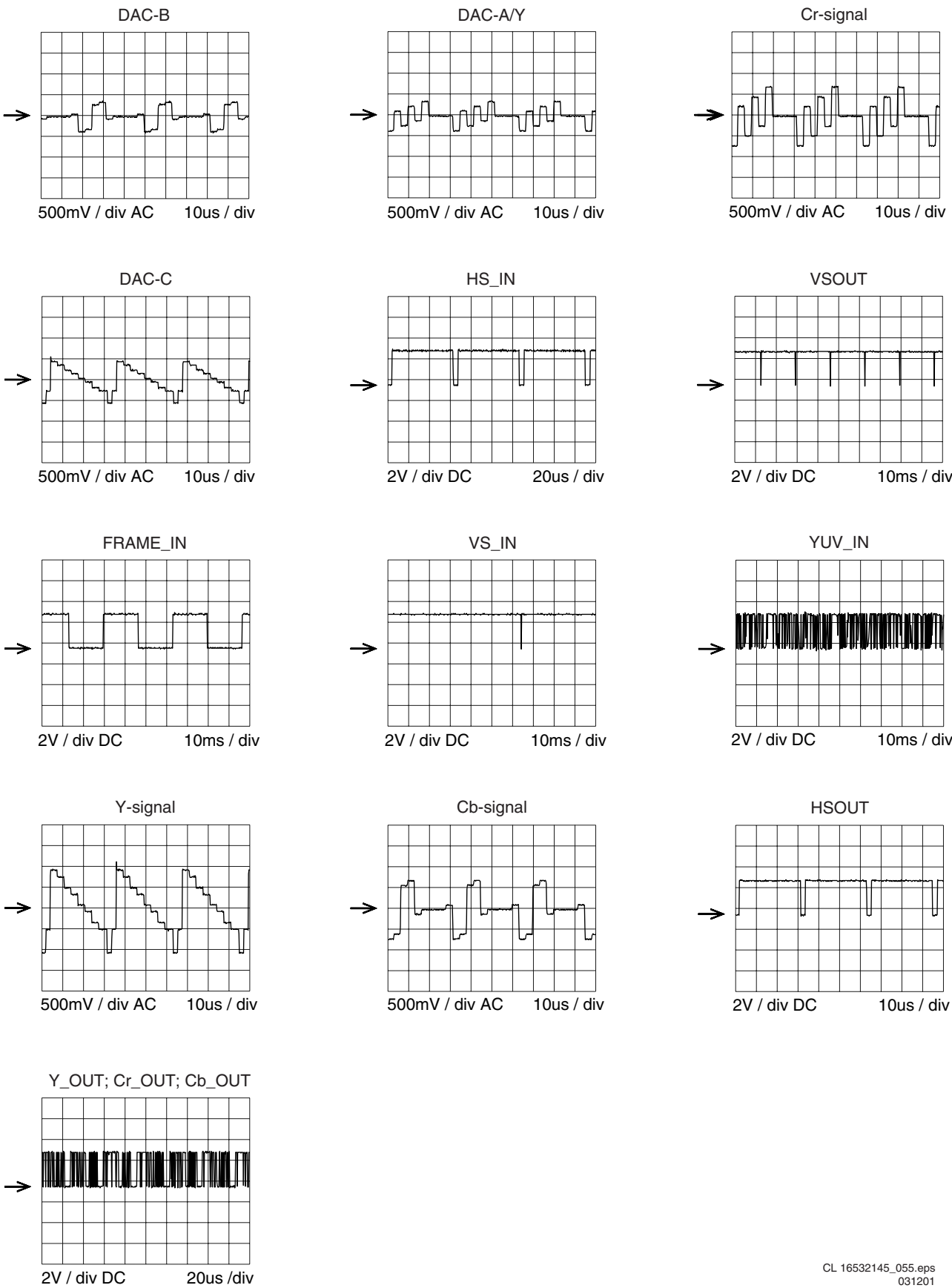


Figure 6-3

Waveforms DVIO

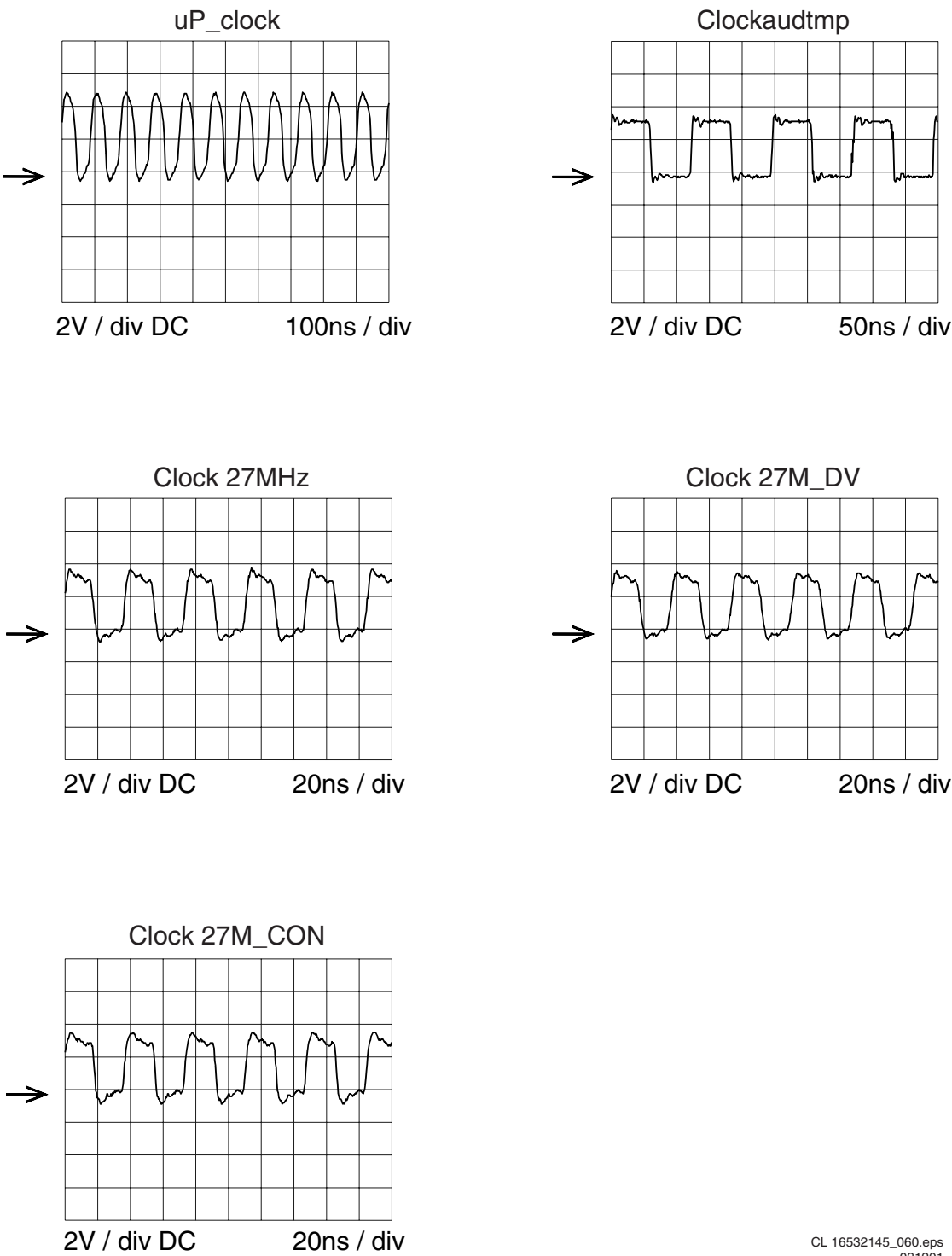
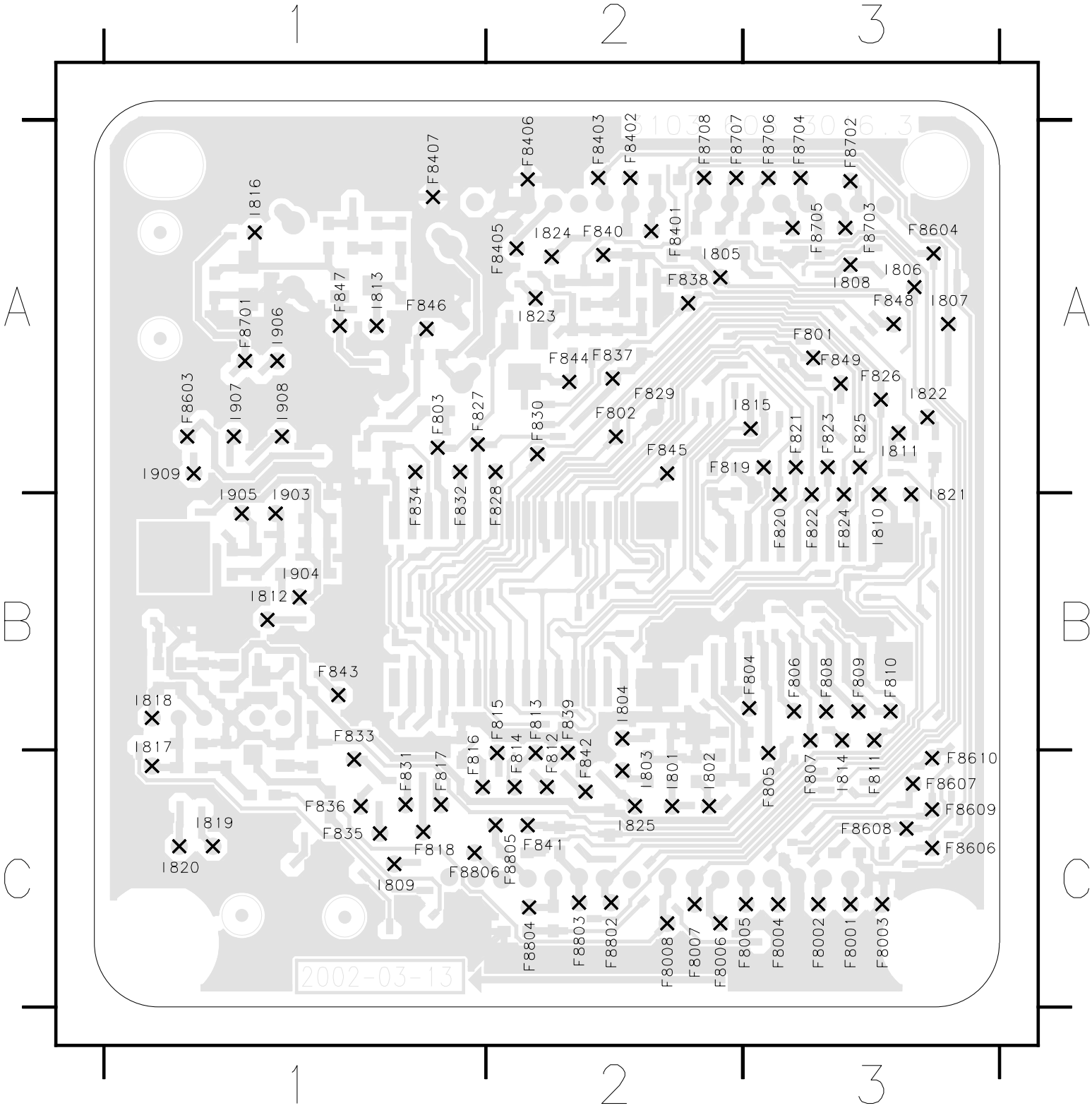


Figure 6-4

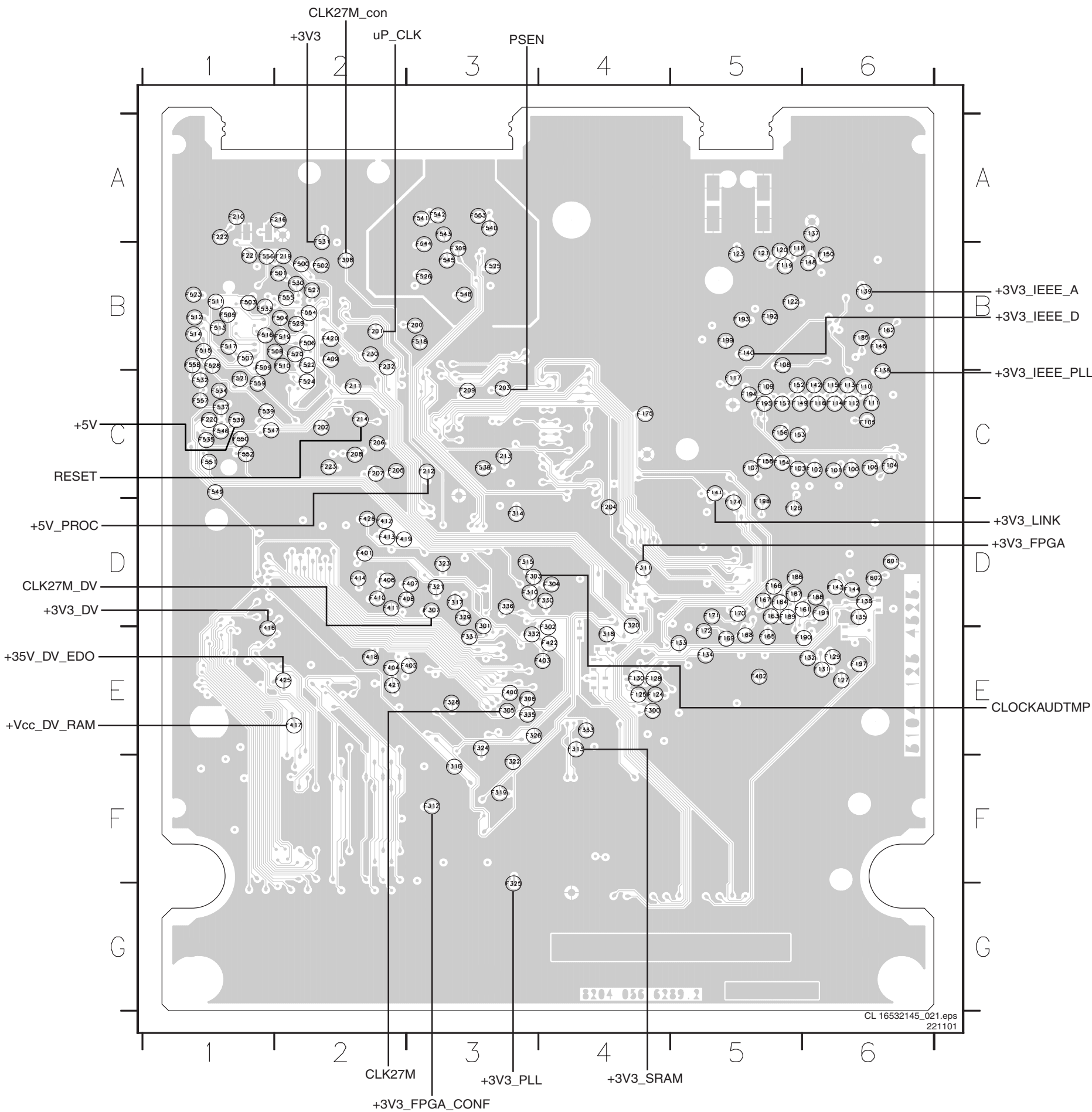
Test points overview UPC12 Sub PCB



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
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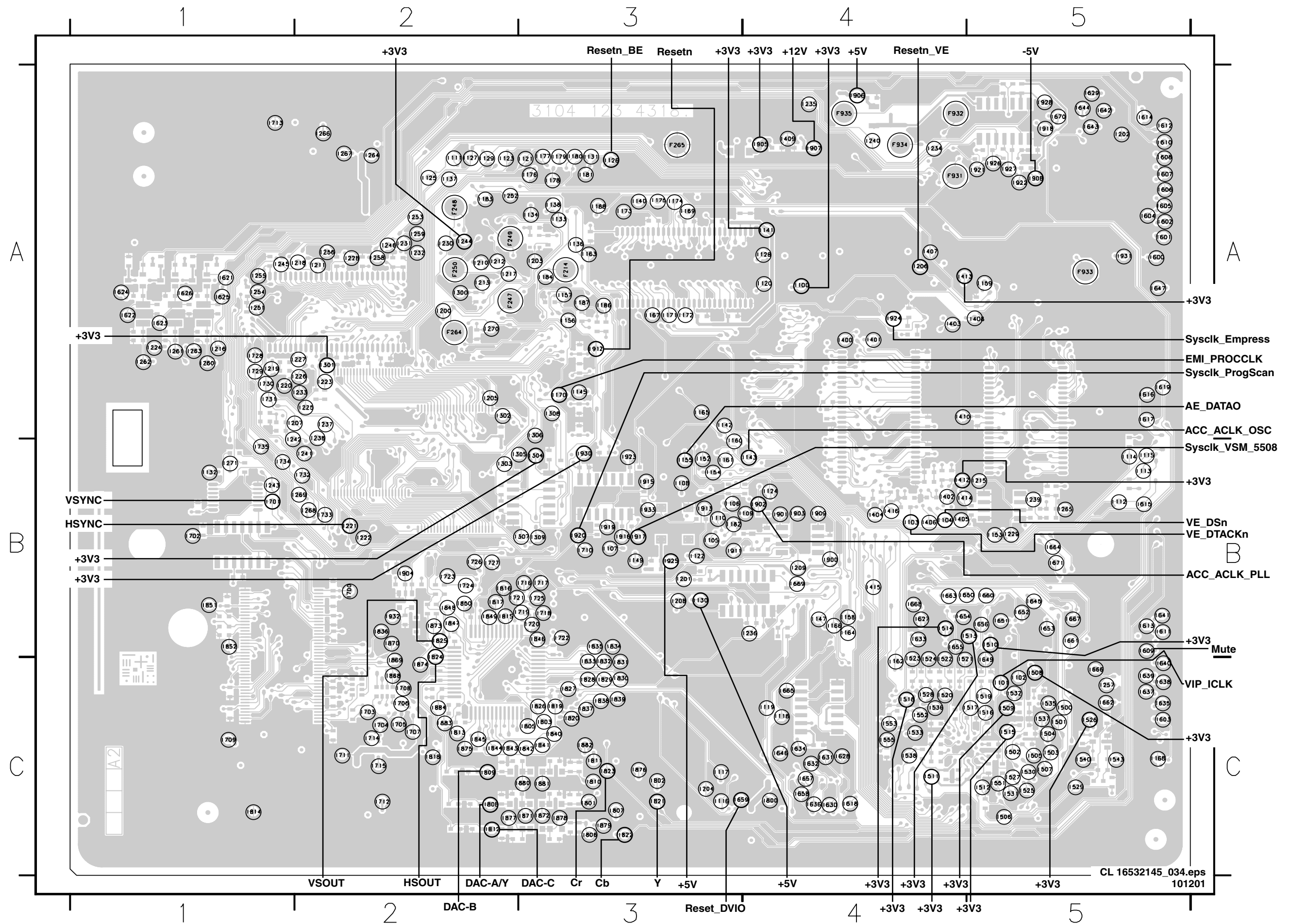
TR 01053_140

Test points overview DIVIO Board



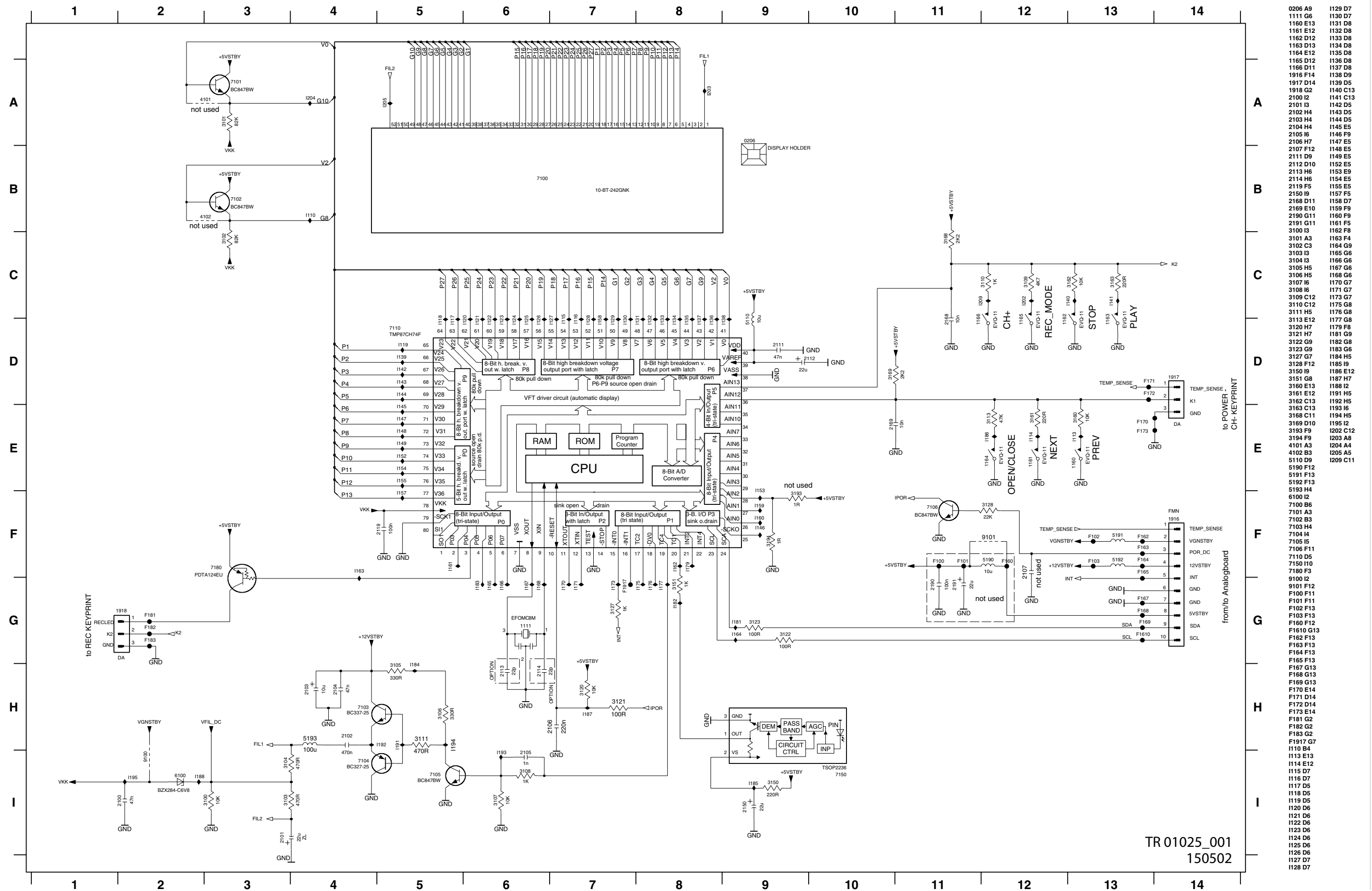
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F101	C6	F146	B6	F207	C2	F329	D3	F514	B1
F102	C6	F148	B6	F207	C2	F330	D4	F514	B1
F102	C6	F148	B6	F208	C2	F330	D4	F515	B1
F102	C6	F149	C5	F208	C2	F331	E3	F515	B1
F103	C5	F149	C5	F209	C3	F331	E3	F516	B1
F104	C6	F150	B6	F209	C3	F332	E3	F516	B1
F105	C6	F150	B6	F210	A1	F332	E3	F517	B1
F106	C6	F152	C5	F210	A1	F333	E4	F517	B1
F106	C6	F152	C5	F211	C2	F333	E4	F518	B3
F107	C5	F153	C5	F211	C2	F335	E3	F518	B3
F107	C5	F153	C5	F212	C3	F335	E3	F519	B2
F108	B5	F154	C5	F212	C3	F336	D3	F519	B2
F108	B5	F154	C5	F213	C3	F336	D3	F520	B2
F109	C5	F156	C5	F213	C3	F400	E3	F520	B2
F109	C5	F157	C5	F214	C2	F400	E3	F521	C1
F110	C6	F157	C5	F214	C2	F401	D2	F521	C1
F110	C6	F158	C5	F216	A2	F401	D2	F522	B2
F111	C6	F161	D6	F216	A2	F402	E5	F523	B1
F111	C6	F161	D6	F219	B2	F403	E4	F523	B1
F112	C6	F162	B6	F219	B2	F403	E4	F524	C2
F112	C6	F162	B6	F220	C1	F404	E2	F524	C2
F113	C6	F162	B6	F220	C1	F404	E2	F525	B3
F113	C6	F163	D5	F221	B1	F405	E3	F525	B3
F114	C6	F163	D5	F221	B1	F405	E3	F526	B3
F114	C6	F165	E5	F222	A1	F406	D2	F526	B3
F115	C6	F165	E5	F222	A1	F406	D2	F527	B2
F115	C6	F166	D5	F223	C2	F407	D3	F527	B2
F116	C6	F166	D5	F230	B2	F407	D3	F528	B1
F116	C6	F167	D5	F230	B2	F408	D2	F528	B1
F117	C5	F167	D5	F232	B2	F408	D2	F529	B2
F117	C5	F168	E5	F232	B2	F409	B2	F529	B2
F118	B5	F168	E5	F300	E4	F409	B2	F530	B2
F118	B5	F169	E5	F300	E4	F410	D2	F530	B2
F119	B5	F169	E5	F301	D3	F410	D2	F531	A2
F119	B5	F170	D5	F301	D3	F411	D2	F531	B2
F120	B5	F170	D5	F302	E4	F411	D2	F532	C1
F120	B5	F171	D5	F302	E4	F412	D2	F532	C1
F121	B5	F171	D5	F303	D3	F412	D2	F533	B1
F121	B5	F172	E5	F303	D3	F413	D2	F533	B1
F122	B5	F172	E5	F304	D4	F413	D2	F534	C1
F122	B5	F174	D5	F304	D4	F414	D2	F534	C1
F123	B5	F174	D5	F305	E3	F414	D2	F535	C1
F123	B5	F175	C4	F305	E3	F416	E1	F535	C1
F124	E4	F175	C4	F306	E3	F416	E1	F536	C1
F124	E4	F184	D5	F306	E3	F417	E2	F536	C1
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F125	E4	F185	B6	F307	D3	F418	E2	F537	C1
F126	D5	F185	B6	F308	B2	F418	E2	F538	C3
F126	D5	F186	D5	F308	B2	F419	D2	F538	C3
F127	E6	F186	D5	F309	B3	F419	D2	F539	C1
F127	E6	F187	D5	F309	B3	F420	B2	F539	C1
F128	E4	F187	D5	F310	D3	F420	B2	F540	A3
F128	E4	F188	D6	F310	D3	F421	E2	F540	A3
F128	E4	F188	D6	F311	D4	F421	E2	F541	A3
F129	E6	F189	D5	F311	D4	F422	E4	F541	A3
F129	E6	F189	D5	F312	F3	F422	E4	F542	A3
F130	E4	F190	E6	F312	F3	F425	E2	F542	A3
F130	E4	F190	E6	F313	E4	F425	E2	F543	A3
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F132	E6	F192	B5	F314	D3	F500	B2	F544	B3
F132	E6	F192	B5	F315	D3	F500	B2	F545	B3
F133	E5	F193	B5	F315	D3	F501	B2	F545	B3
F133	E5	F193	B5	F316	F3	F501	B2	F546	C1
F134	E5	F194	C5	F316	F3	F502	B2	F546	C1
F134	E5	F194	C5	F317	D3	F502	B2	F547	C1
F135	D6	F195	C5	F317	D3	F503	B1	F547	C1
F135	D6	F195	C5	F318	E4	F503	B1	F548	B3
F136	D6	F197	E6	F318	E4	F504	B2	F548	B3
F136	D6	F197	E6	F319	F3	F504	B2	F549	C1
F137	A6	F198	D5	F319	F3	F505	B1	F549	C1
F137	A6	F198	D5	F320	D4	F505	B1	F550	C1
F138	C6	F199	B5	F320	D4	F506	B2	F550	C1
F138	C6	F200	B3	F321	D3	F506	B2	F551	C1
F139	B6	F200	B3	F321	D3	F507	B1	F551	C1
F139	B6	F201	B2	F322	F3	F507	B1	F552	C1
F140	B5	F201	B2	F322	F3	F508	B2	F552	C1
F140	B5	F202	C2	F323	D3	F508	B2	F553	A3
F141	C5	F202	C2	F323	D3	F509	B1	F553	A3
F141	C5	F203	C3	F324	E3	F509	B1	F554	B2
F142	C6	F203	C3	F324	E3	F510	B2	F554	B2
F142	C6	F204	D4	F325	G3	F510	B2	F555	B2
F143	D6	F204	D4	F325	G3	F511	B1	F555	B2
F143	D6	F205	C2	F326	E3	F511	B1	F556	B1
F144	D6	F205	C2	F328	E3	F512	B1	F556	B1
						F512	B1	F557	C1

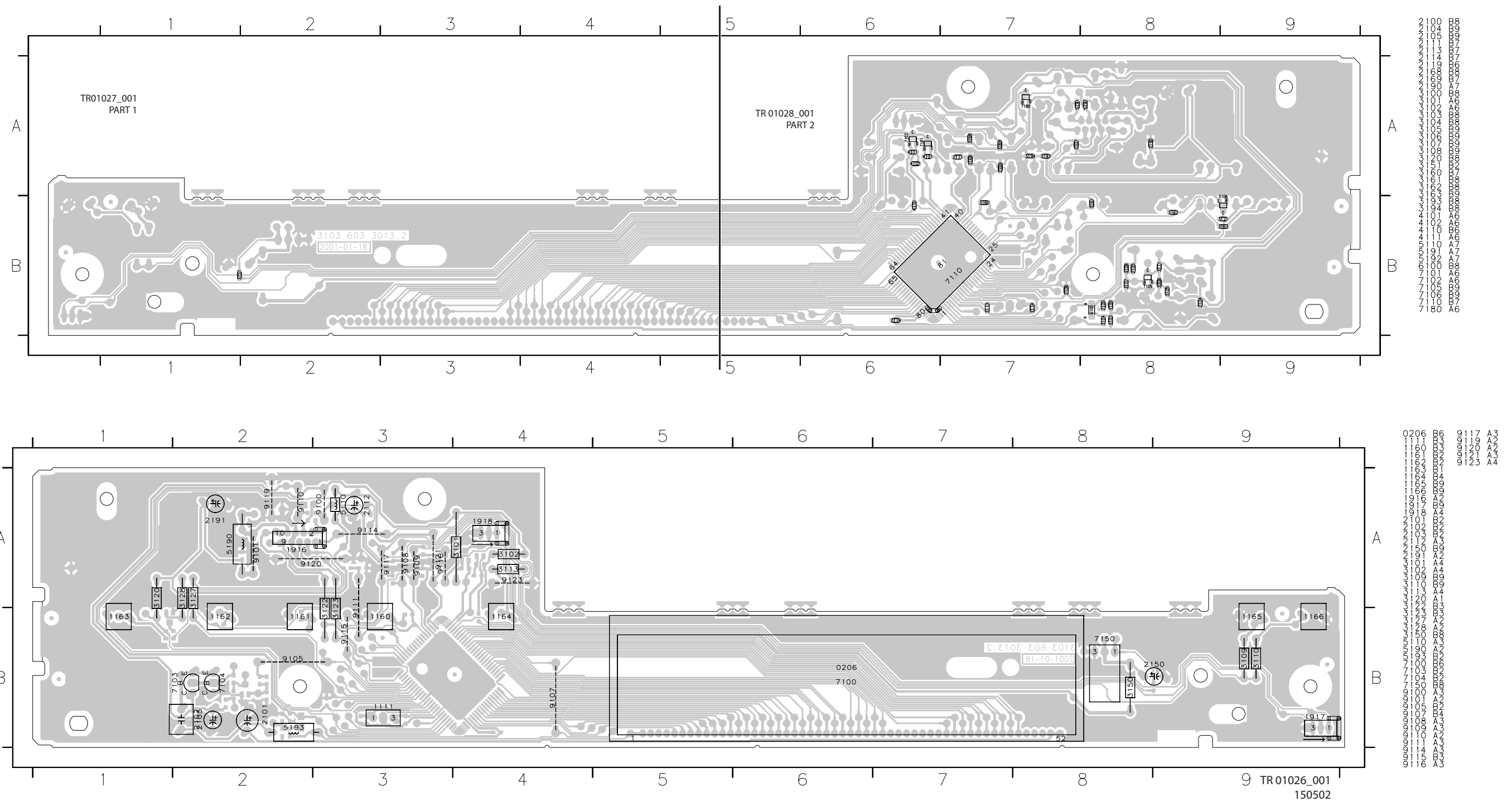
Test points overview Digital Board



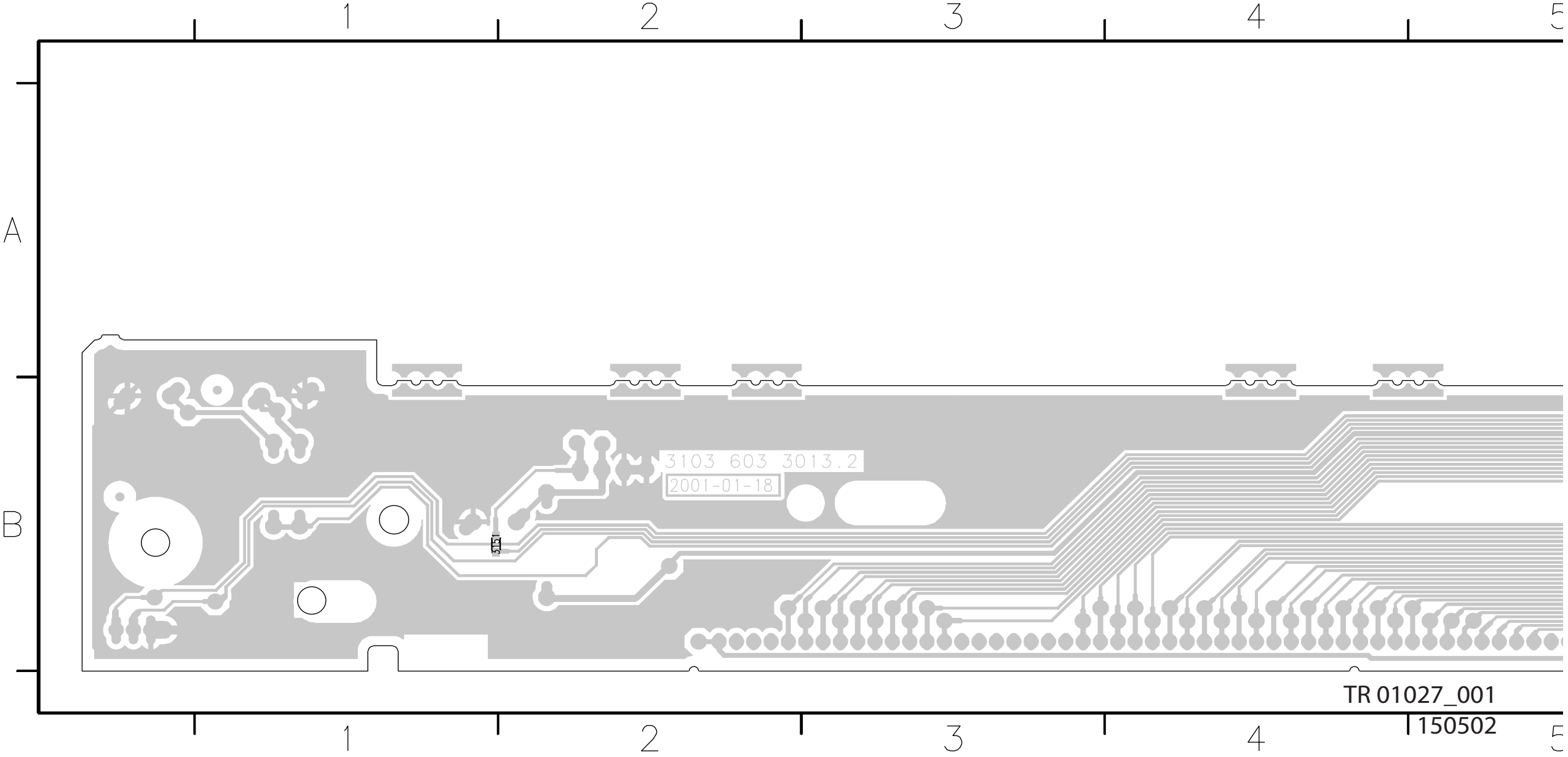
Layout Digital Board (Mapping Testlands)

F214	A3	I175	A3	I300	A2	I610	A5	I720	B3	I880	C3
F247	A2	I176	A3	I301	A2	I611	B5	I721	B2	I881	C3
F248	A2	I177	A3	I302	A2	I612	A5	I722	B3	I882	C3
F249	A2	I178	A3	I303	B2	I613	B5	I723	B2	I883	C2
F250	A2	I179	A3	I304	B3	I614	A5	I724	B2	I884	C2
F264	A2	I180	A3	I305	B3	I615	B5	I725	B3	I900	B4
F265	A3	I181	A3	I306	A3	I616	A5	I726	B2	I901	B4
F931	A4	I182	B3	I307	B3	I617	A5	I727	B2	I902	B4
F932	A4	I183	A2	I308	A3	I618	C4	I728	A1	I903	B4
F933	A5	I184	A3	I309	B3	I619	A5	I729	A1	I904	B2
F934	A4	I186	A3	I400	A4	I621	A1	I730	A1	I905	A4
F935	A4	I187	A3	I401	A4	I622	A1	I731	A1	I906	A4
I100	A4	I188	A3	I402	B4	I623	A1	I732	B2	I907	A4
I101	C5	I200	A2	I403	A4	I624	A1	I733	B2	I908	A5
I102	C5	I201	B3	I404	B4	I625	A1	I734	B1	I909	B4
I103	B4	I202	A5	I405	B4	I626	A1	I735	B1	I911	B3
I104	B4	I203	A3	I406	B4	I627	B4	I800	C4	I912	A3
I105	B3	I204	C3	I407	A4	I628	C4	I801	C3	I913	B3
I106	B3	I205	A2	I408	A5	I629	A5	I802	C3	I915	B3
I107	B3	I206	A4	I409	A4	I630	C4	I803	C3	I916	B3
I108	B3	I207	A2	I410	A4	I631	C4	I805	C3	I917	B3
I109	B4	I208	B3	I412	B4	I632	C4	I806	C3	I918	A5
I110	B3	I209	B4	I413	A4	I633	B4	I807	C3	I919	B3
I111	A2	I210	A2	I414	B4	I634	C4	I808	C2	I920	B3
I112	B5	I211	A2	I415	B4	I635	C5	I809	C2	I921	A5
I113	B5	I212	A2	I416	B4	I636	C4	I810	C3	I922	A5
I114	B5	I213	A2	I500	C5	I637	C5	I811	C3	I923	B3
I115	B5	I215	B5	I501	C5	I638	C5	I812	C2	I924	A4
I116	C3	I216	A1	I502	C5	I639	C5	I813	C2	I925	B3
I117	C3	I217	A2	I503	C5	I640	C5	I814	C1	I926	A5
I118	C4	I218	A2	I504	C5	I641	B5	I815	B2	I927	A5
I119	C4	I219	A1	I505	C5	I642	A5	I816	B2	I928	A5
I120	A4	I220	A1	I506	C5	I643	A5	I817	B2	I930	B3
I121	A3	I221	B2	I507	C5	I644	A5	I818	C2	I931	A5
I122	B3	I222	B2	I508	C5	I645	B5	I819	C3	I932	B2
I123	A2	I223	A2	I509	C5	I646	C4	I820	C3	I933	B3
I124	B4	I224	A1	I510	B5	I647	A5	I821	C3		
I125	A2	I225	A2	I511	C4	I649	C5	I822	C3		
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I129	A2	I229	B5	I515	C5	I653	B5	I826	C3		
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I131	A3	I231	A2	I517	C5	I655	B4	I828	C3		
I132	B1	I232	A2	I518	C4	I656	B5	I829	C3		
I133	A3	I233	A2	I519	C5	I657	C4	I830	C3		
I134	A3	I234	A4	I520	C4	I658	C4	I831	C3		
I136	A3	I235	A4	I521	C4	I659	C3	I832	C3		
I137	A2	I236	B4	I522	C4	I660	B5	I833	C3		
I138	A3	I237	A2	I523	C4	I661	B5	I834	B3		
I140	A3	I238	A2	I524	C4	I662	C5	I835	B3		
I141	A4	I239	B5	I525	C5	I663	B4	I836	B2		
I142	A3	I240	A4	I526	C5	I664	B5	I837	C3		
I143	B4	I241	B2	I527	C5	I665	C4	I838	C3		
I145	A3	I242	B1	I528	C4	I666	C5	I839	C3		
I147	B4	I243	B1	I529	C5	I667	B5	I840	C3		
I149	B3	I244	A2	I530	C5	I668	B4	I841	C3		
I152	B3	I245	A1	I531	C5	I669	B4	I842	C3		
I153	B5	I246	A2	I532	C5	I670	A5	I843	C2		
I154	B3	I251	A1	I533	C4	I671	B5	I844	C2		
I155	B3	I252	A2	I535	C5	I700	B2	I845	C2		
I156	A3	I253	A2	I536	C4	I701	B1	I846	B3		
I157	A3	I254	A1	I537	C5	I702	B1	I847	B2		
I158	B4	I255	A1	I538	C4	I703	C2	I848	B2		
I159	A5	I256	A2	I540	C5	I704	C2	I849	B2		
I160	B3	I257	C5	I543	C5	I705	C2	I850	B2		
I161	B3	I258	A2	I551	C5	I706	C2	I851	B1		
I162	C4	I259	A2	I552	C4	I707	C2	I852	B1		
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I164	B4	I261	A1	I555	C4	I709	C1	I869	C2		
I165	A3	I262	A1	I600	A5	I710	B3	I870	B2		
I166	B4	I263	A1	I601	A5	I711	C2	I871	C3		
I167	A3	I264	A2	I602	A5	I712	C2	I872	C3		
I168	C5	I265	B5	I603	C5	I713	A1	I873	B2		
I169	A3	I266	A2	I604	A5	I714	C2	I874	C2		
I170	A3	I267	A2	I605	A5	I715	C2	I875	C2		
I171	A3	I268	B2	I606	A5	I716	B3	I876	C3		
I172	A3	I269	B2	I607	A5	I717	B3	I877	C2		
I173	A3	I270	A2	I608	A5	I718	B3	I878	C3		
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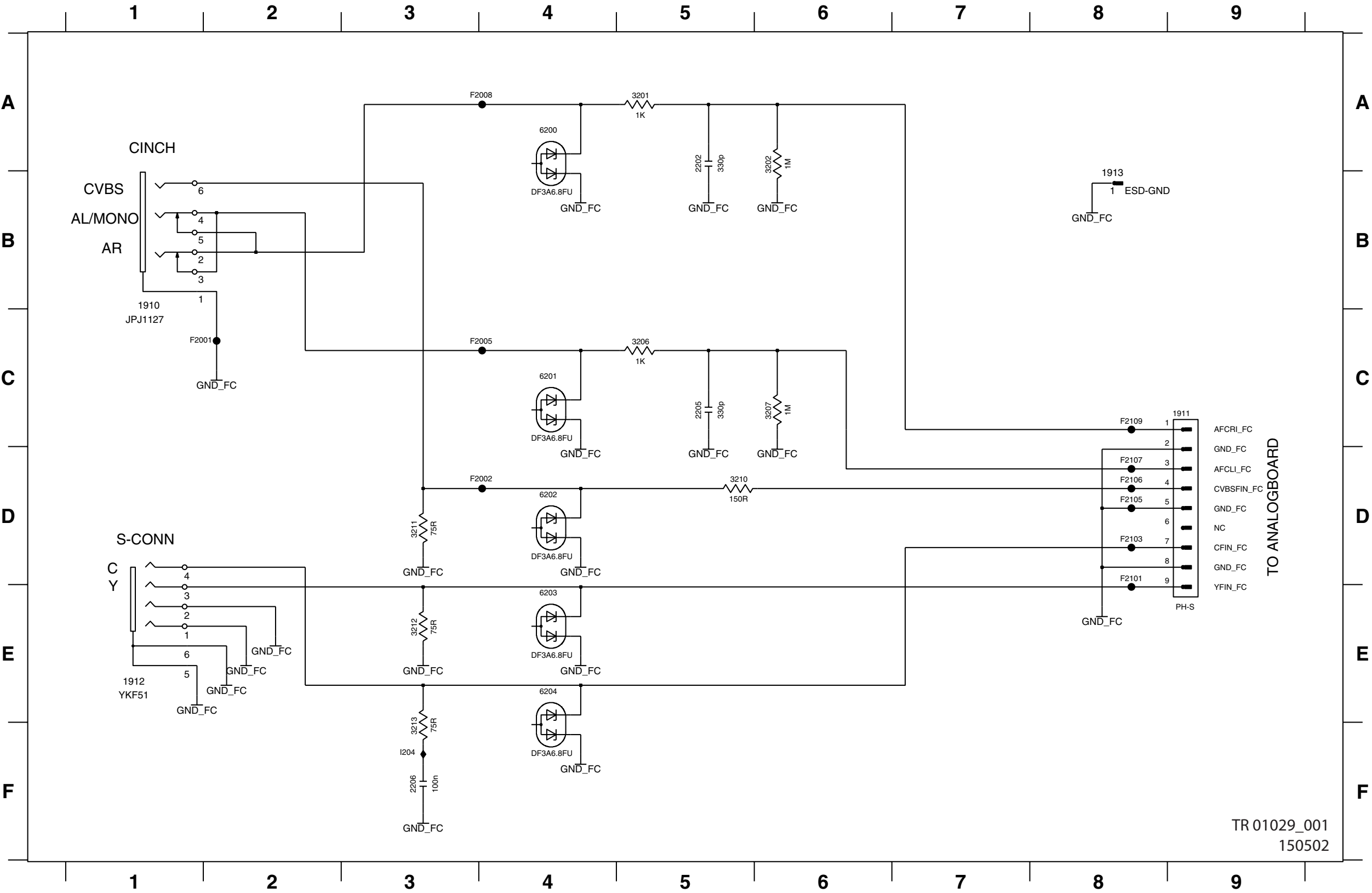




Layout Display Panel (Part 1 Bottom View)

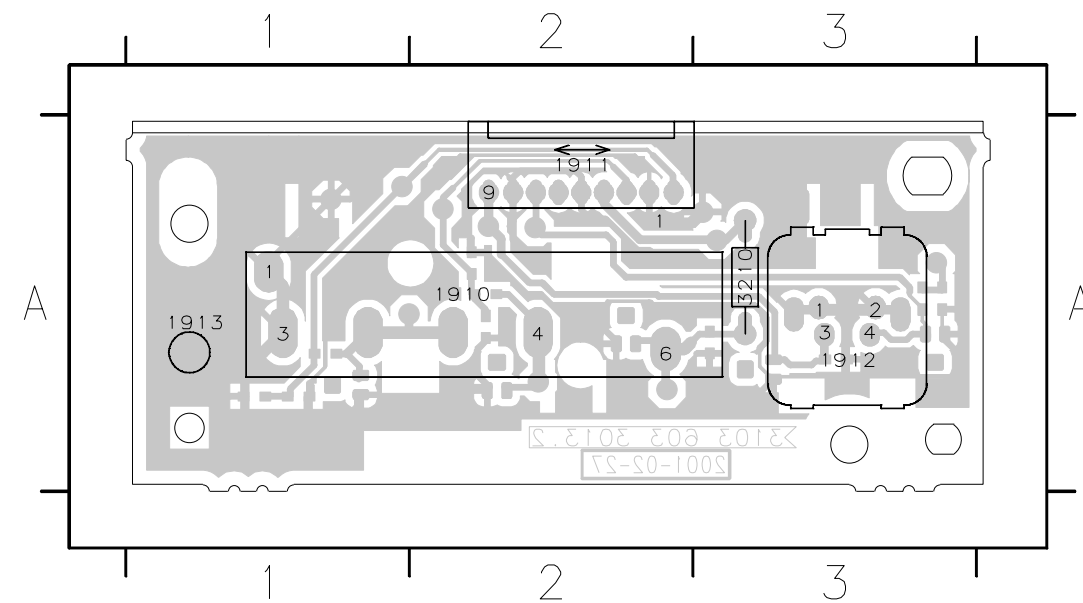


Front Connector Panel (FC)



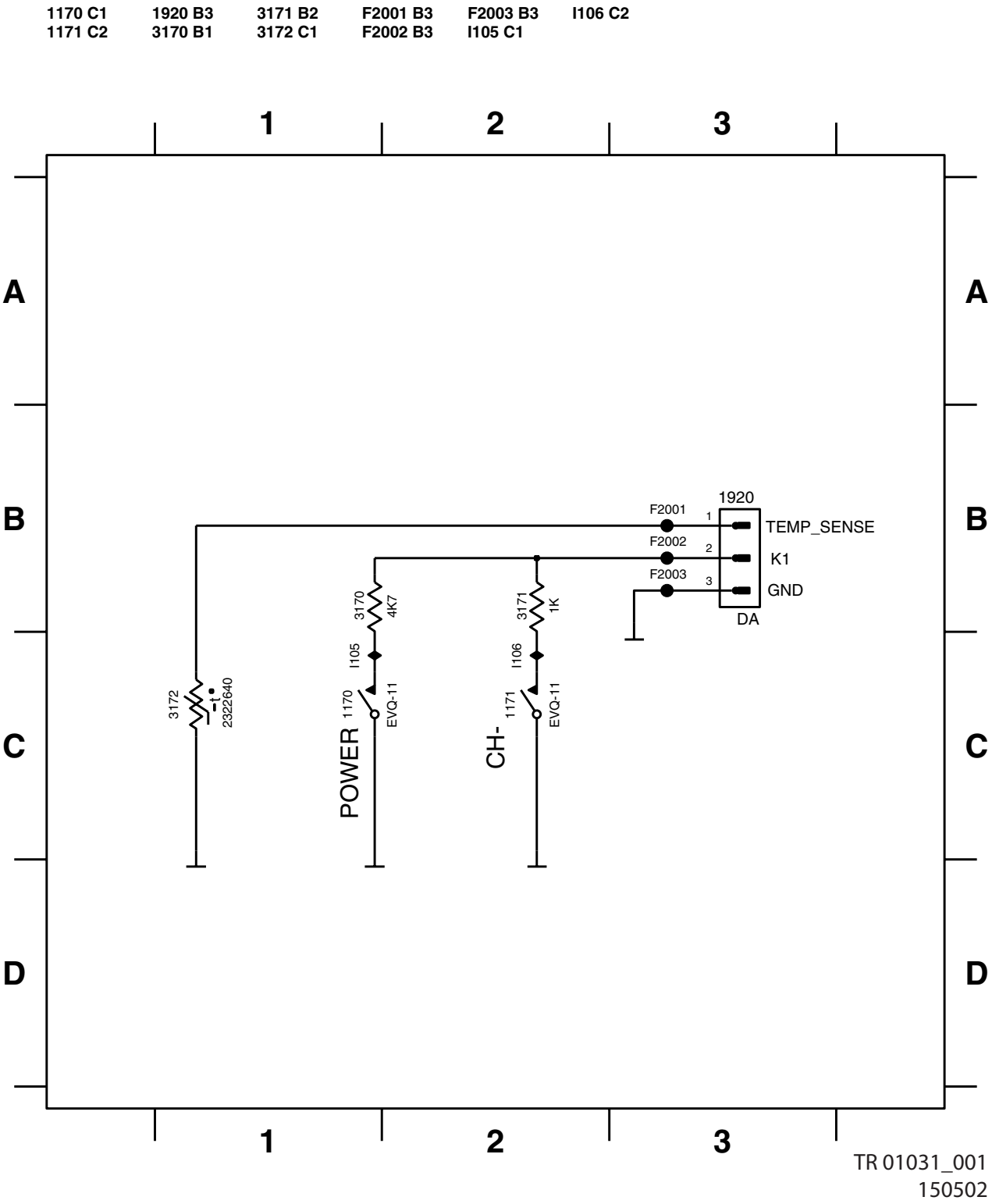
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150502

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2202 A3	3200 A3	3205 A2	3211 A2	4203 A3	6204 A1
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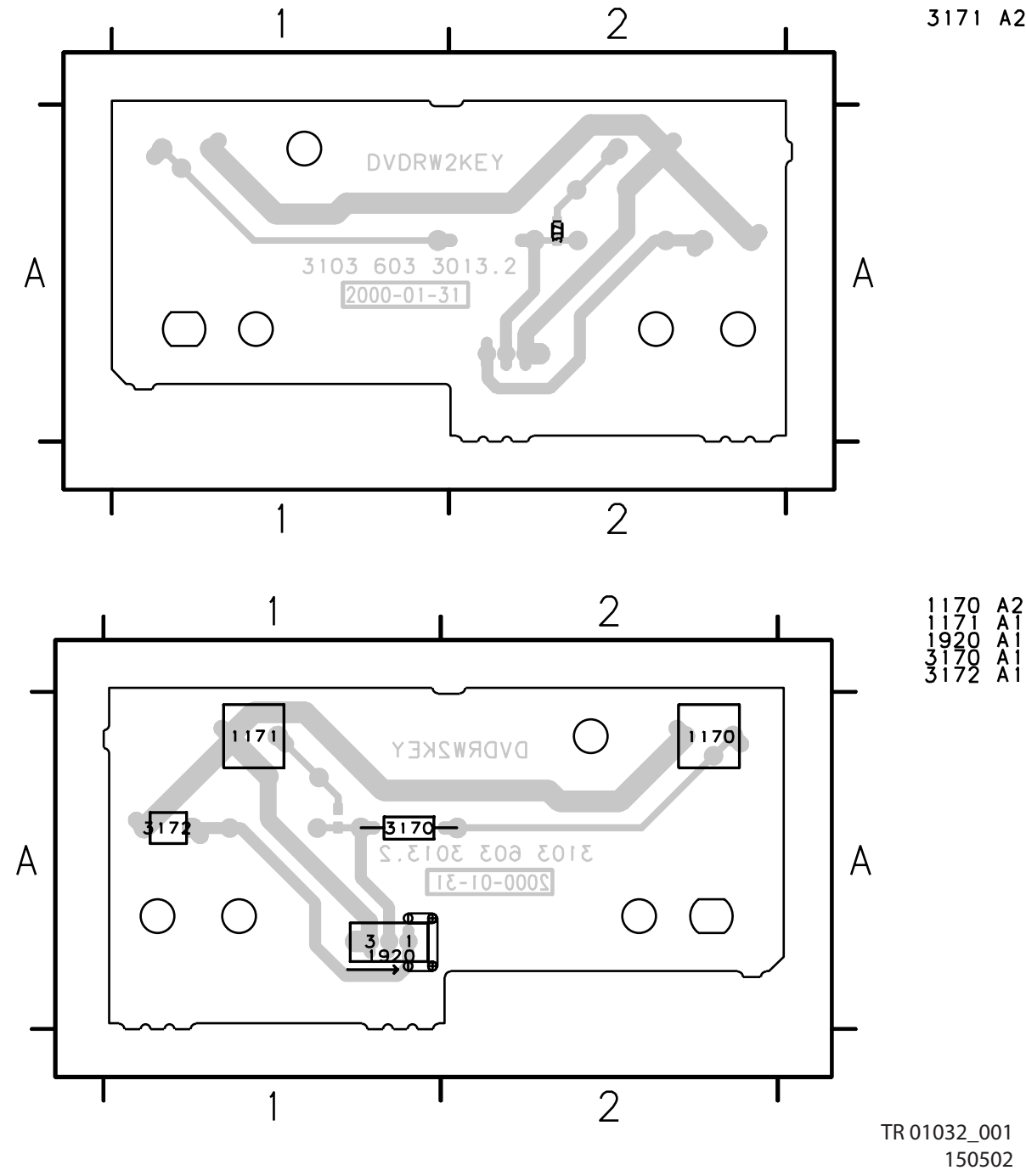


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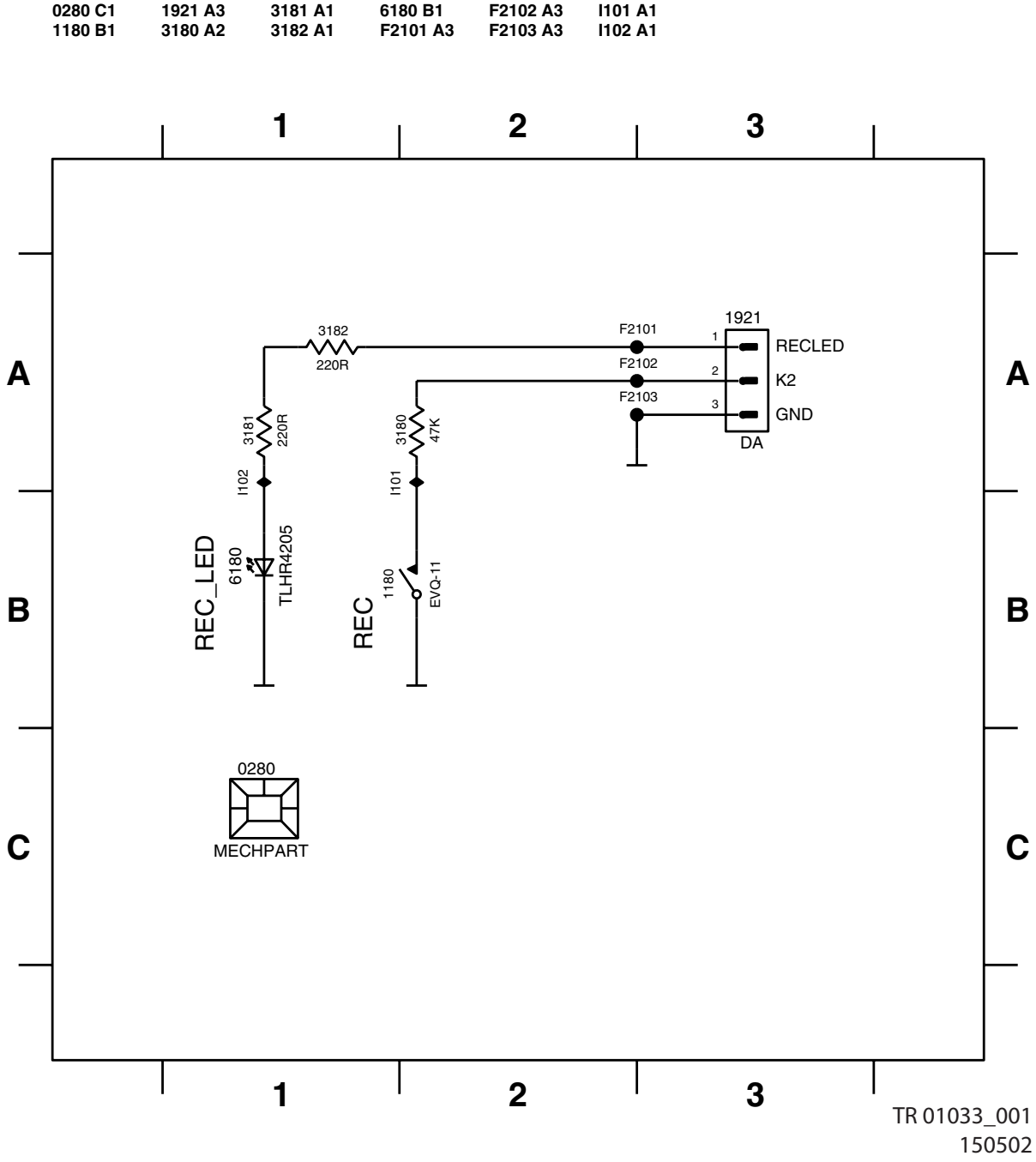
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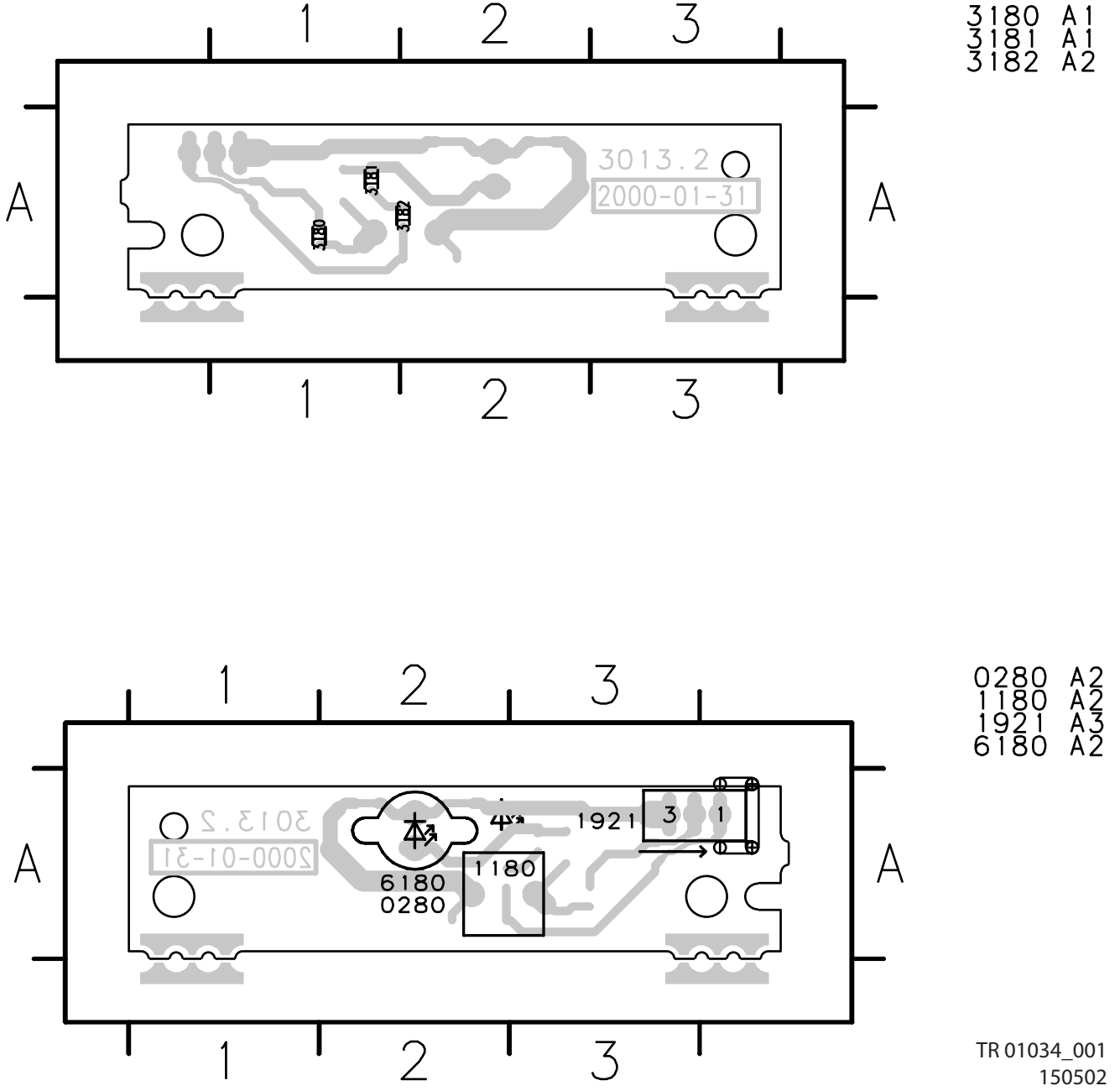
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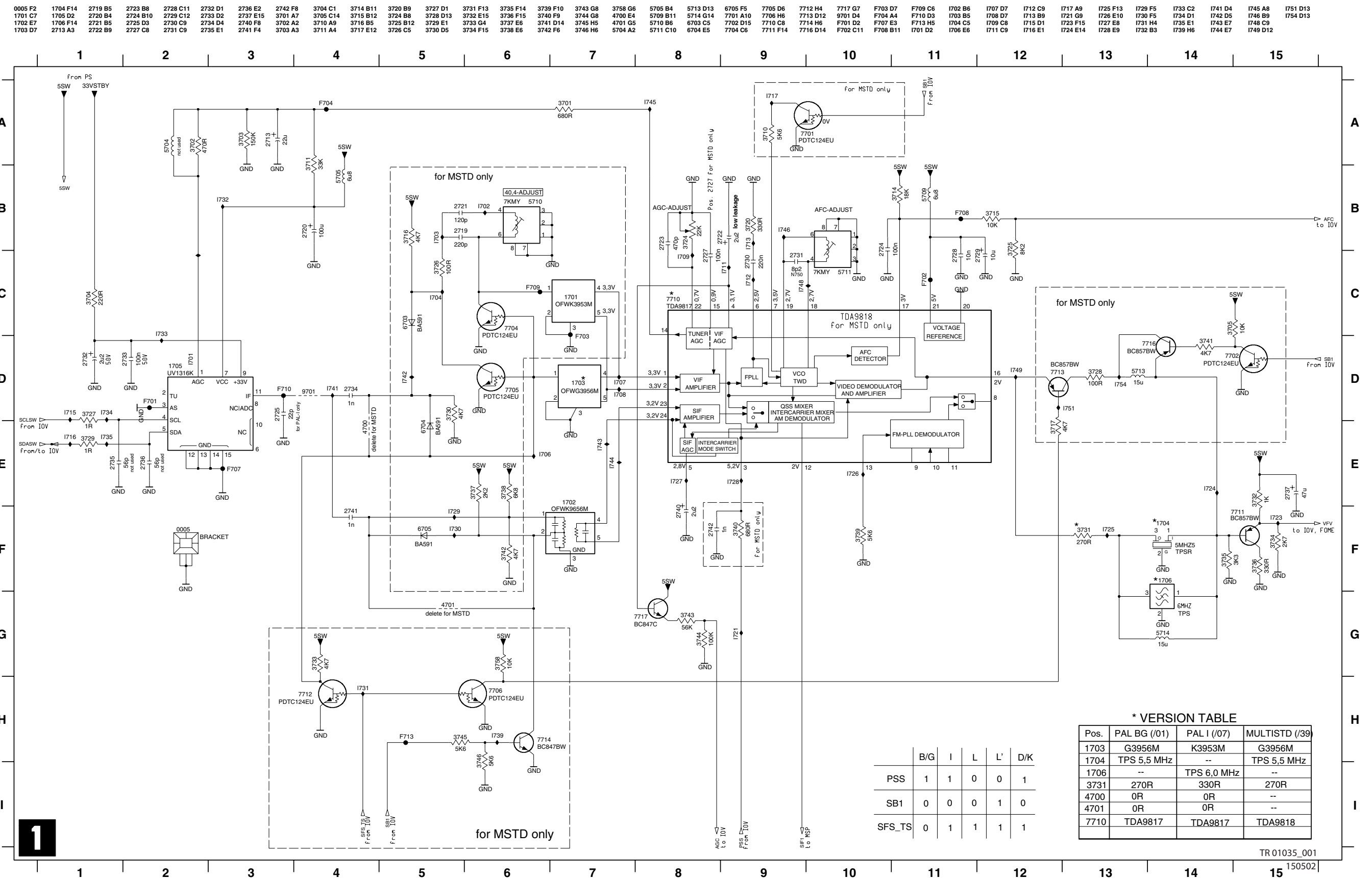


Record Key Panel (REC)



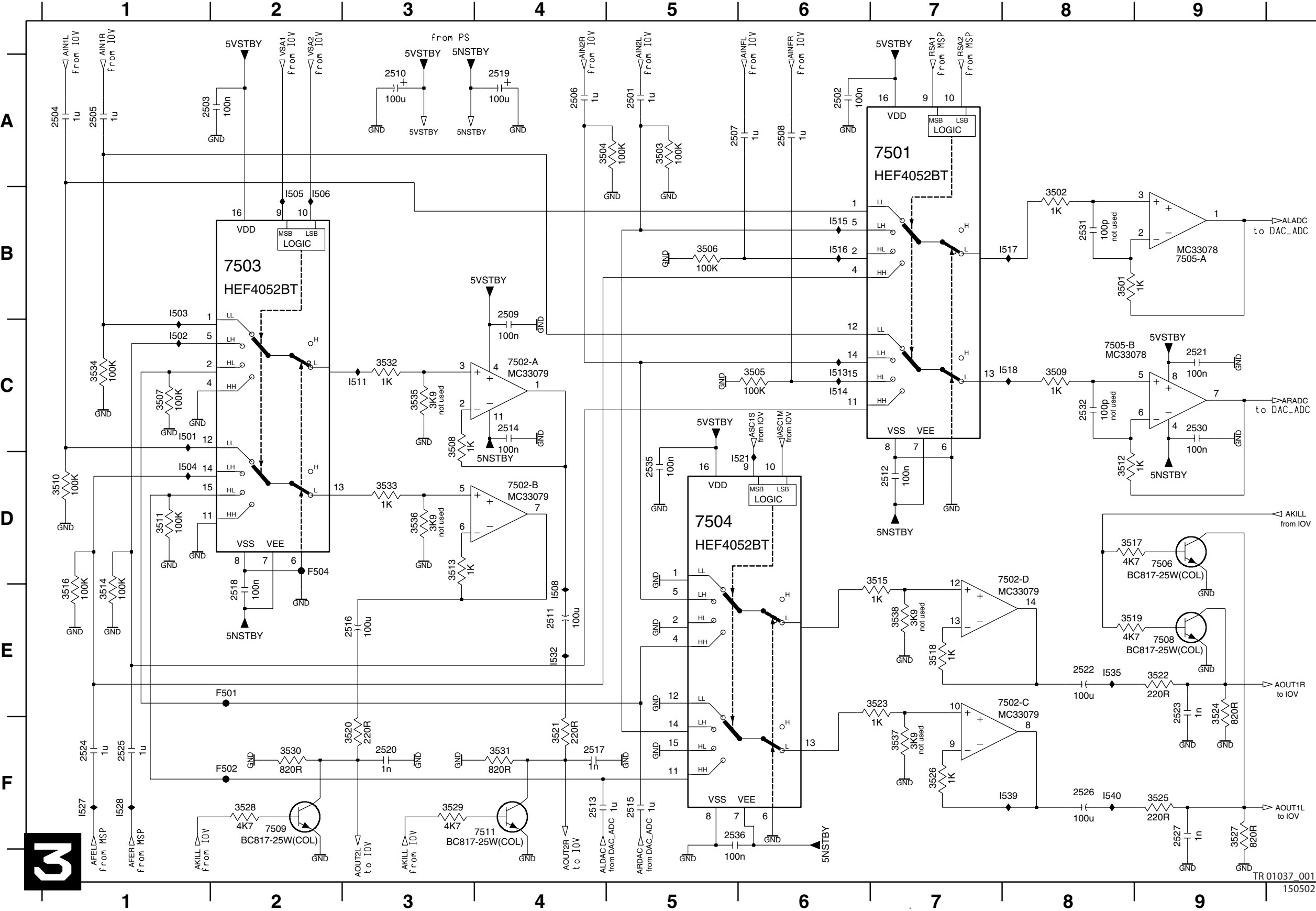
Layout Record Key Panel (REC)





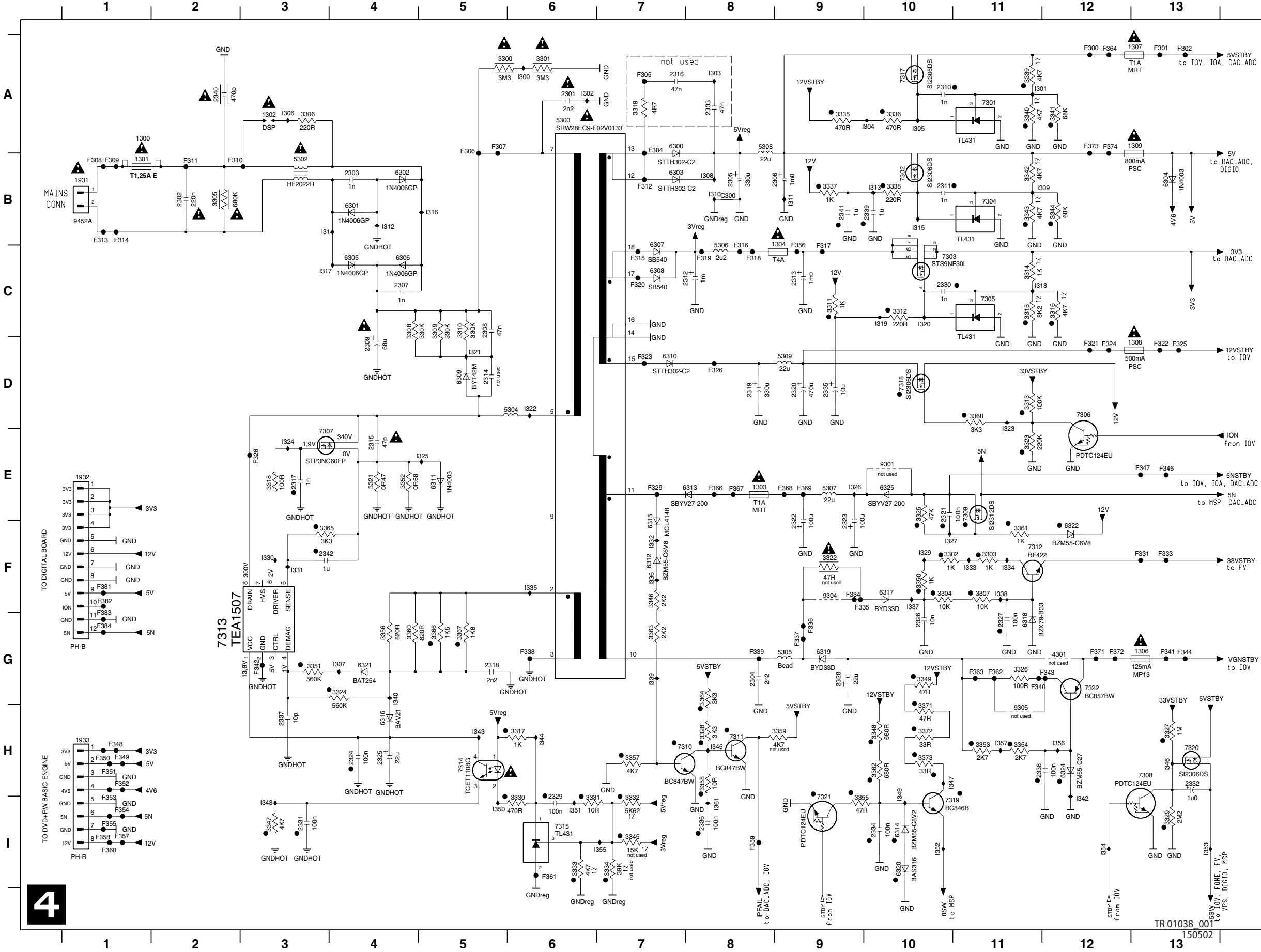
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1941: A 14
1942 E 1
1943: A 1
1945: I 2
1946: F 1
1948 F 14
1949: A H14
1949: C G14
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2402 B3
2403 D3
2404 D3
2405 C8
2406 D3
2407 I 2
2408 F3
2409 D8
2410 C 4
2411 D6
2412 I 2
2413 C7
2414 C7
2415 C10
2416 F3
2417 F4
2418 F9
2420 F13
2421 F13
2422 F3
2423 F13
2424 G13
2425 G12
2426 F13
2428 F2
2429 E12
2432 H13
2433 H13
2434 C8
2435 H13
2436 I 2
2437 E9
2438 F9
2439 E9
2440 E9
2441 E10
2442 H13
2443 H13
2444 H13
2445 H13
2446 H6
2447 H14
2448 H13
2449 F1
2450 H13
2451 G11
2452 H11
2453 H13
2454 A3
2455 H3
2456 H3
2457 B1
2458 B1
2459 E2
2460 H1
2461 B11
2462 B12
2463 B12
2464 B4
2465 B2
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2467 B3
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Analog Board: IN/Out Audio (IOA)



- 2501 A5
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- 2503 A1
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- 2508 A6
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- 2519 A4
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- 2521 C9
- 2522 E8
- 2523 E9
- 2524 F1
- 2525 F1
- 2526 F8
- 2527 F9
- 2530 C9
- 2531 B8
- 2532 C8
- 2535 D5
- 2536 F5
- 3501 B8
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- 3507 C1
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- 3524 E9
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- 3527 F9
- 3528 F2
- 3529 F3
- 3530 F2
- 3531 F4
- 3532 C3
- 3533 D3
- 3534 C1
- 3535 C3
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- 3537 F7
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- 7502-C E7
- 7502-D D7
- 7503 B2
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- 7508 E9
- 7509 F2
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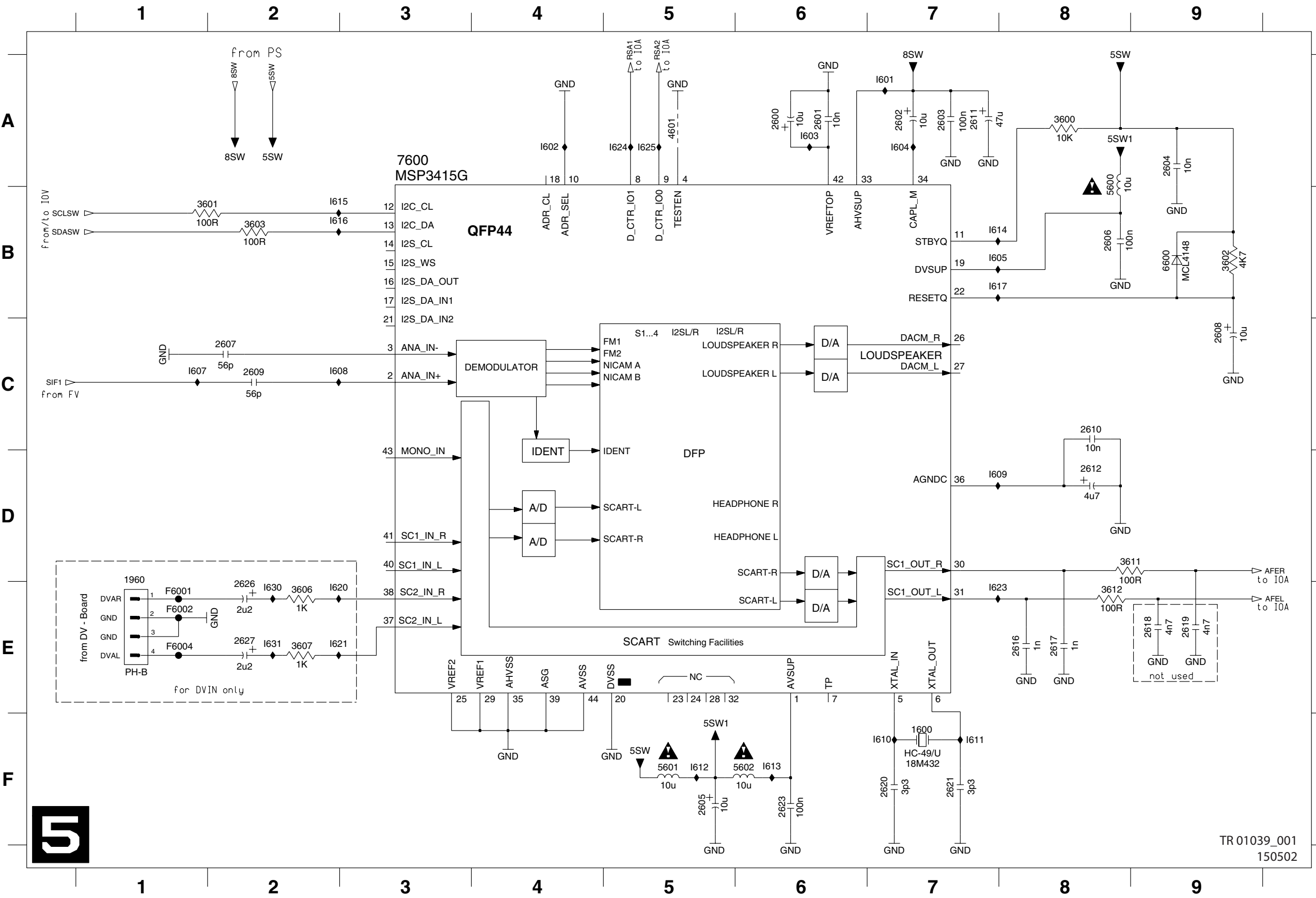
Analog Board: Power Supply (PS)



4

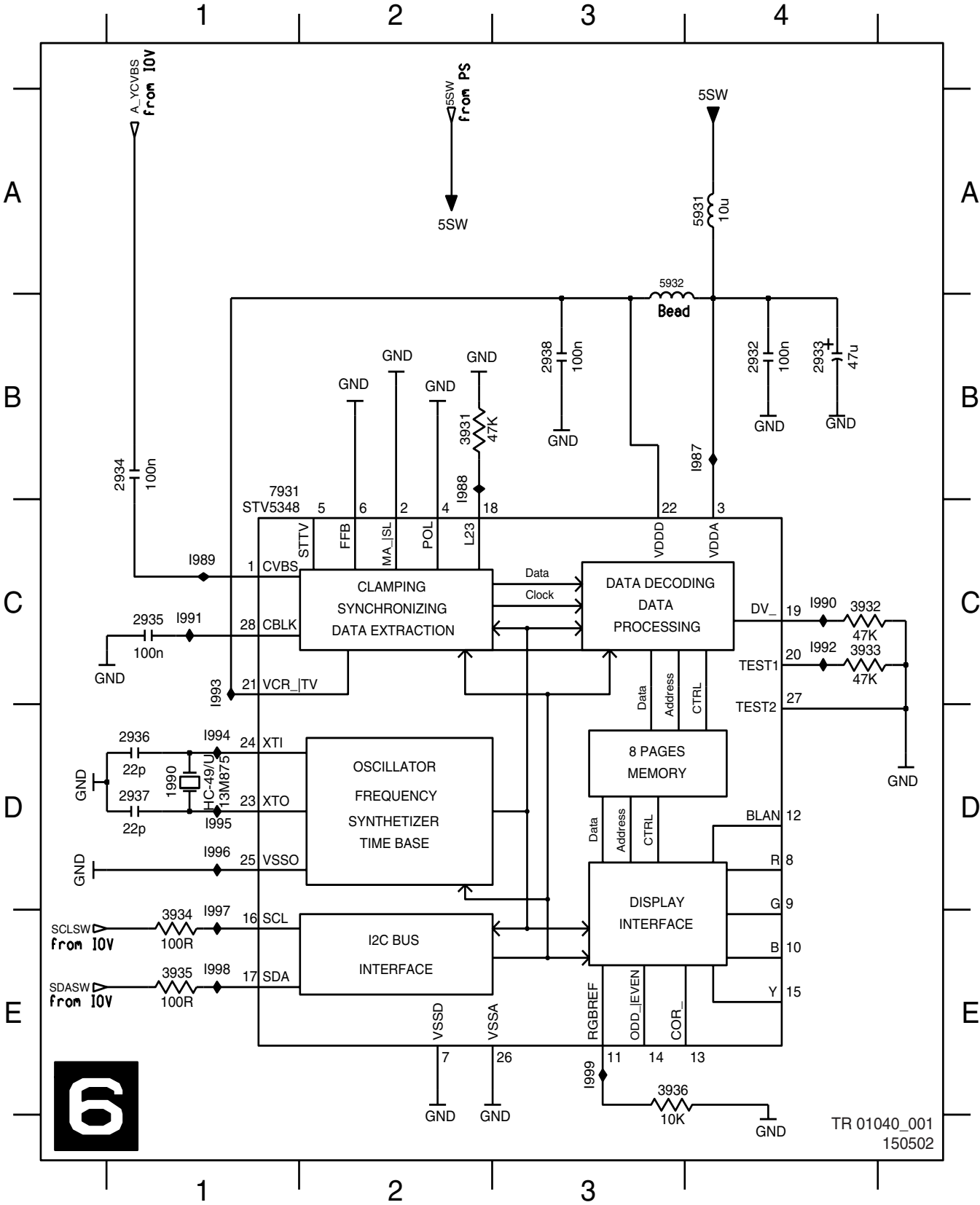
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1306 G13	3372 H10	F362 G11
1307 A13	3373 H10	F363 G11
1308 D13	4301 G12	F364 A12
1309 A13	5300 A6	F366 E8
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1313 H1	5305 G9	F369 E9
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2316 A7	6311 E5	I307 G4
2317 E3	6312 F7	I308 B8
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2338 H11	7309 E11	I330 F3
2339 B10	7310 H7	I331 F3
2340 A2	7311 H8	I332 F7
2341 B9	7312 F11	I333 F11
2342 F3	7313 G2	I334 F11
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3303 F11	7318 D10	I338 F11
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3307 F11	7322 G12	I343 H5
3308 C4	9301 E10	I344 H6
3309 C5	9304 F9	I345 H8
3310 C5	9305 H11	I346 H13
3311 C9	C300 B8	I347 H10
3312 C10	F300 A12	I348 I3
3313 D11	F301 A13	I349 H10
3314 C11	F302 A13	I350 I5
3315 C11	F304 A7	I351 I6
3316 C12	F305 A7	I352 I10
3317 H6	F306 B5	I353 I13
3318 E3	F307 A5	I354 I12
3319 A7	F308 B1	I355 I7
3321 E4	F309 B1	I356 H12
3322 F9	F310 B2	I357 H11
3323 E11	F311 B2	I361 I8
3324 G4	F312 B7	
3325 E10	F313 B1	
3326 G11	F314 B1	
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3328 H8	F316 C8	
3329 I13	F317 C9	
3330 I6	F318 C8	
3331 I6	F319 C8	
3332 I7	F320 C7	
3333 I6	F321 D12	
3334 I7	F322 D13	
3335 A9	F323 D7	
3336 A10	F324 D12	
3337 B9	F325 D13	
3338 B10	F326 D8	
3339 A11	F328 E3	
3340 A11	F329 E7	
3341 A12	F331 F13	
3342 B11	F333 F13	
3343 B11	F334 F9	
3344 B12	F335 F9	
3345 I7	F336 G9	
3346 F7	F337 G9	
3347 I3	F338 G6	
3348 H10	F339 G8	
3349 G10	F340 G11	
3350 F10	F341 G13	
3351 G3	F342 G3	
3352 E4	F343 G12	
3353 H11	F344 G13	
3354 H11	F346 E13	
3355 I9	F347 E13	
3356 G4	F348 H1	
3357 H7	F349 H1	
3358 H8	F350 H1	
3359 H9	F351 H1	
3360 G4	F352 H1	
3361 F11	F353 I1	
3362 H10	F354 I1	
3363 G7	F355 I1	
3364 G8	F356 C9	

Analog Board: Multi Sound Processing (MSP)



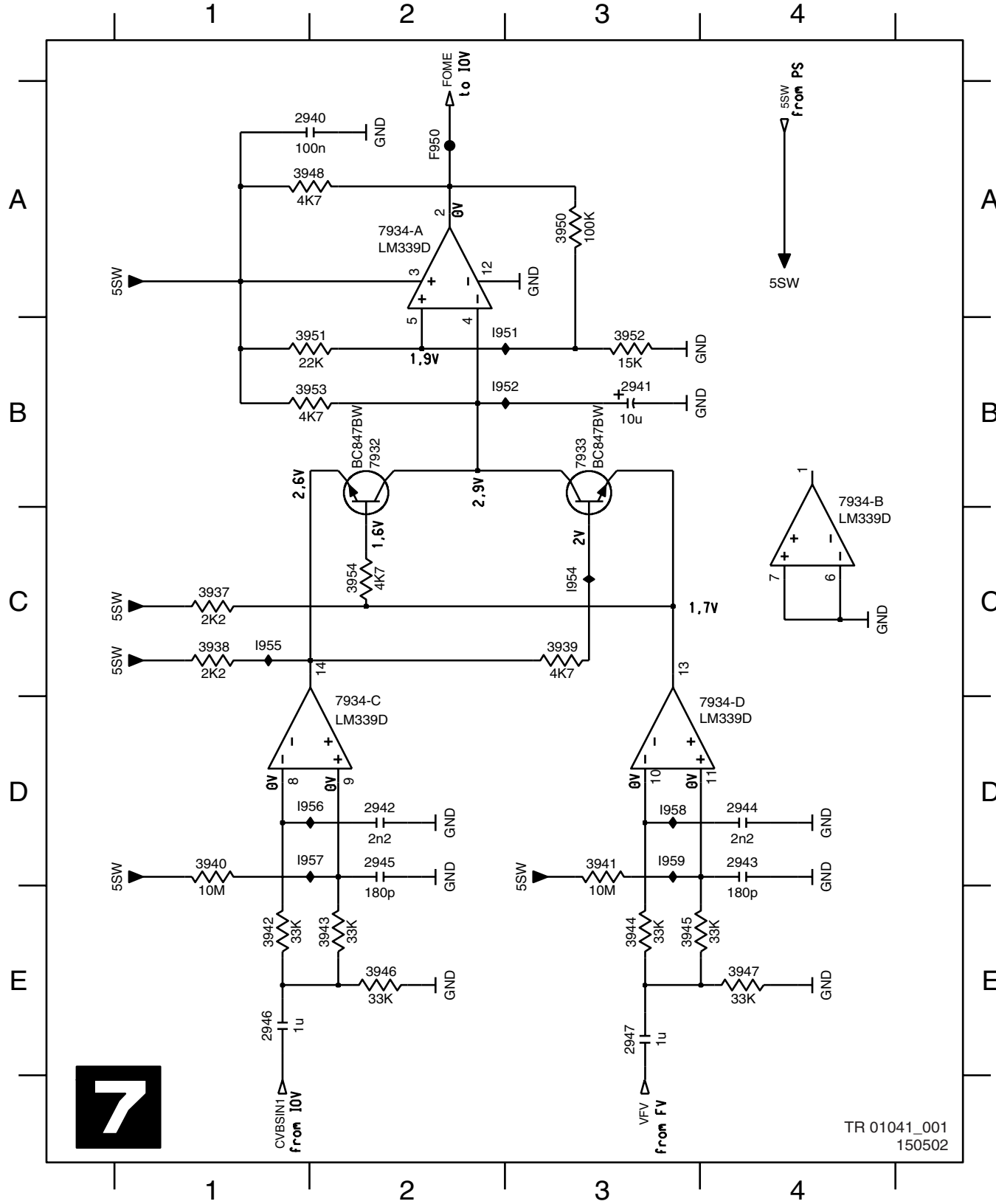
Analog Board: VPS (VPS)

1990 D1 2934 B1 2937 D1 3932 C4 3935 E1 5932 A3 1988 B2 1991 C1 1994 D1 1997 E1
2932 B4 2935 C1 2938 B3 3933 C4 3936 E3 7931 B2 1989 C1 1992 C4 1995 D1 1998 E1
2933 B4 2936 D1 3931 B2 3934 E1 5931 A4 1987 B4 1990 C4 1993 C1 1996 D1 1999 E3



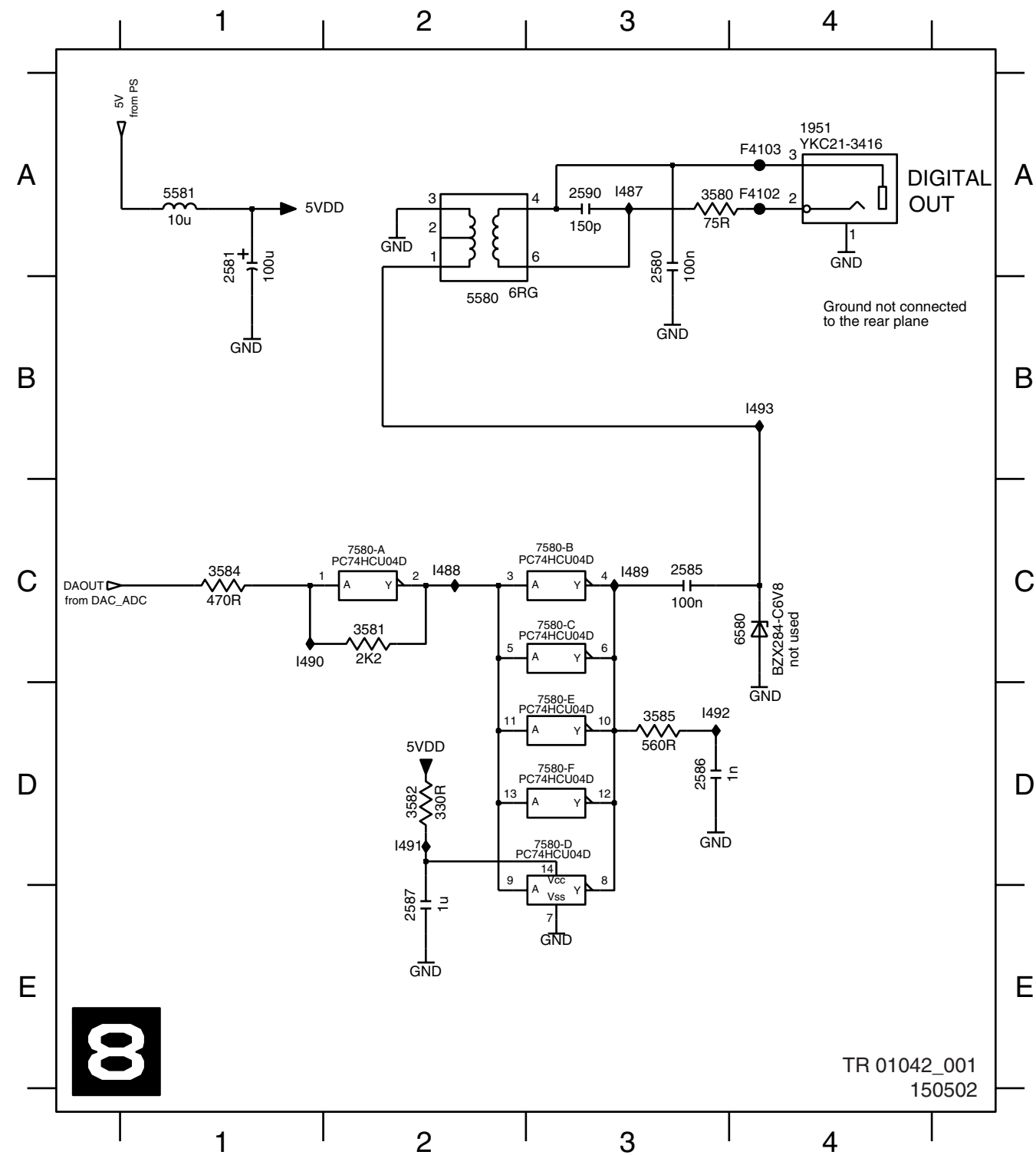
Analog Board: Follow Me (FOME)

2940 A2 2944 D4 3937 C1 3941 D3 3945 E3 3950 A3 3954 C2 7934-B B4 1951 B3 1956 D2
2941 B3 2945 D2 3938 C1 3942 E1 3946 E2 3951 B2 7932 B2 7934-C C2 1952 B3 1957 D2
2942 D2 2946 E1 3939 C3 3943 E2 3947 E4 3952 B3 7933 B3 7934-D D3 1954 C3 1958 D3
2943 D4 2947 E3 3940 D1 3944 E3 3948 A1 3953 B2 7934-A A2 F950 A2 1955 C1 1959 D3

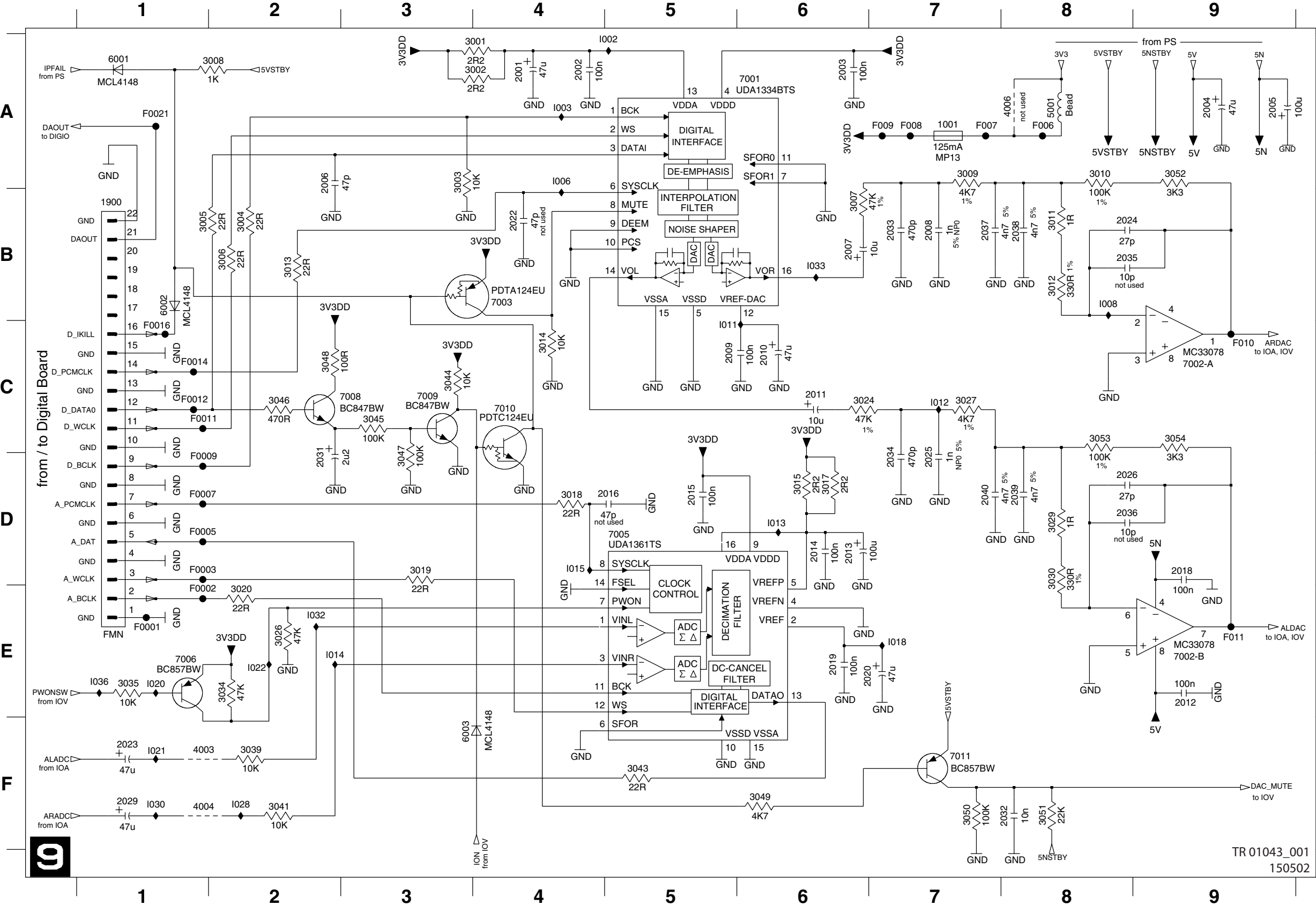


Analog Board: Digital In/Out (DIGIO)

1951 A4	2585 C3	2590 A3	3582 D2	5580 B2	7580-A C2	7580-D D3	F4102 A4	I488 C2	I491 D2
2580 A3	2586 D3	3580 A3	3584 C1	5581 A1	7580-B C3	7580-E D3	F4103 A4	I489 C3	I492 D3
2581 A1	2587 E2	3581 C2	3585 D3	6580 C4	7580-C C3	7580-F D3	I487 A3	I490 C1	I493 B4

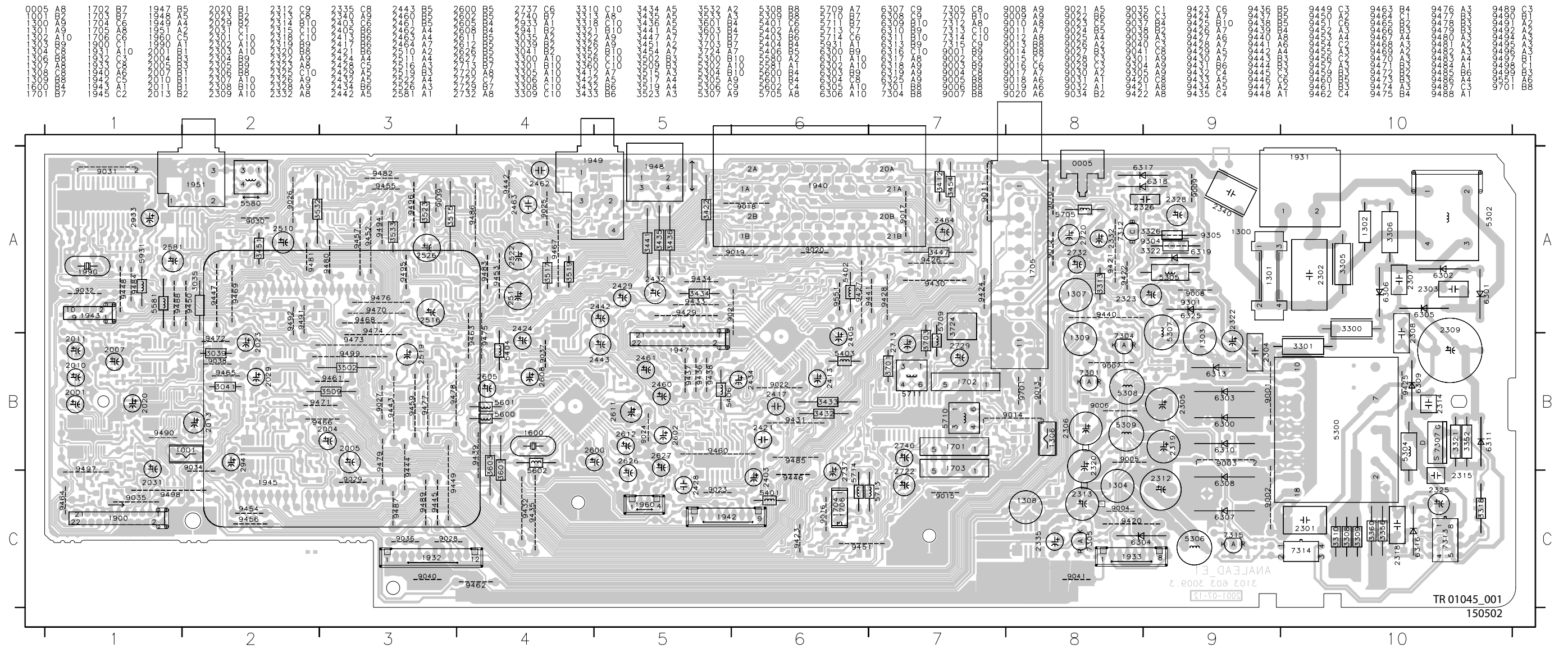


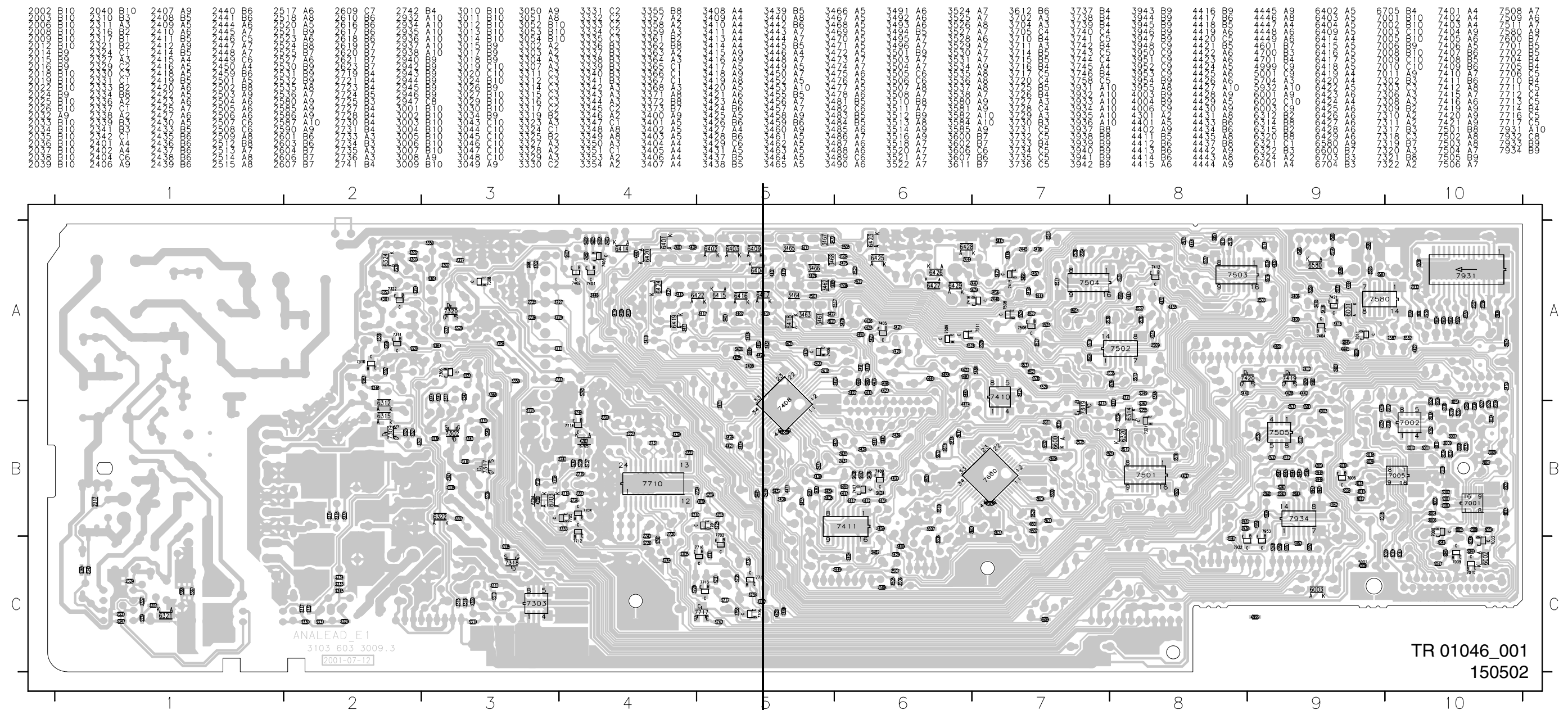
Analog Board: Audio Converter(DAC_ADC)



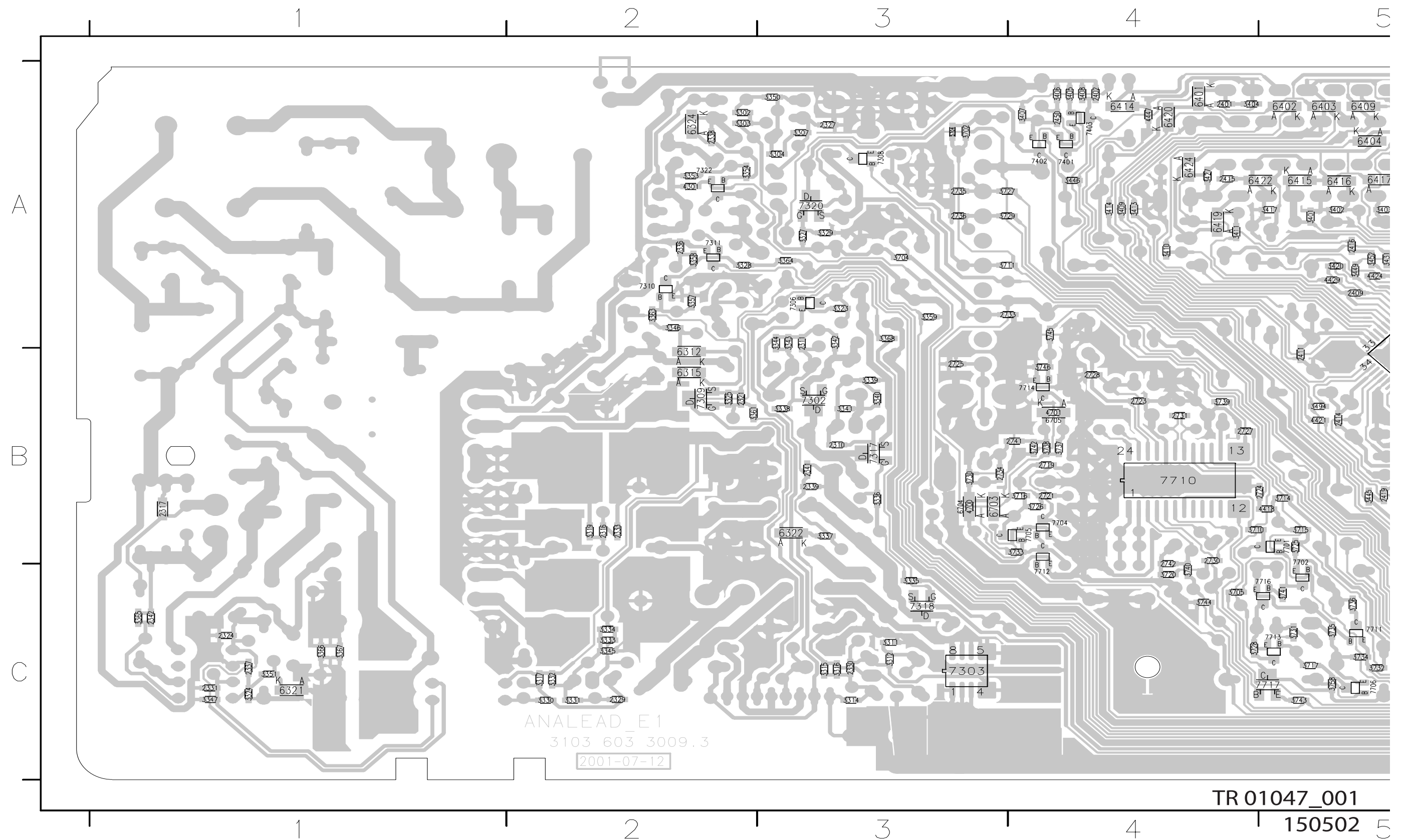
1001 A7	4003 F1
1900 B1	4004 F1
2001 A4	4006 A8
2002 A4	5001 A8
2003 A6	6001 A1
2004 A9	6002 B1
2005 A9	6003 F3
2006 A2	7001 A6
2007 B6	7002-A C9
2008 B7	7002-B E9
2009 C5	7003 B4
2010 C6	7005 D5
2011 C6	7006 E1
2012 E9	7008 C2
2013 D6	7009 C3
2014 D6	7010 C4
2015 D5	7011 F6
2016 D5	F0001 E1
2018 D9	F0002 E1
2019 E6	F0003 D1
2020 E7	F0005 D1
2022 B4	F0007 D1
2023 F1	F0009 D1
2024 B8	F0011 C1
2025 D7	F0012 C1
2026 D8	F0014 C1
2029 F1	F0016 C1
2031 D2	F0021 A1
2032 F7	F006 A8
2033 B7	F007 A7
2034 D7	F008 A7
2035 B8	F009 A7
2036 D8	F010 C9
2037 B7	F011 E9
2038 B8	I002 A5
2039 D8	I003 A4
2040 D7	I006 A4
3001 A4	I008 B8
3002 A4	I011 C5
3003 A3	I012 C7
3004 B2	I013 D6
3005 B1	I014 E2
3006 B2	I015 D4
3007 B6	I018 E7
3008 A2	I020 E1
3009 A7	I021 F1
3010 A8	I022 E2
3011 B8	I028 F2
3012 B8	I030 F1
3013 B2	I032 E2
3014 C4	I033 B6
3015 D6	I036 E1
3017 D6	
3018 D4	
3019 D3	
3020 E2	
3024 C6	
3026 E2	
3027 C7	
3029 D8	
3030 D8	
3034 E2	
3035 E1	
3039 F2	
3041 F2	
3043 F5	
3044 C3	
3045 C3	
3046 C2	
3047 D3	
3048 C2	
3049 F6	
3050 F7	
3051 F7	
3052 A9	
3053 C8	
3054 C9	

Layout Analog Board (Top View)

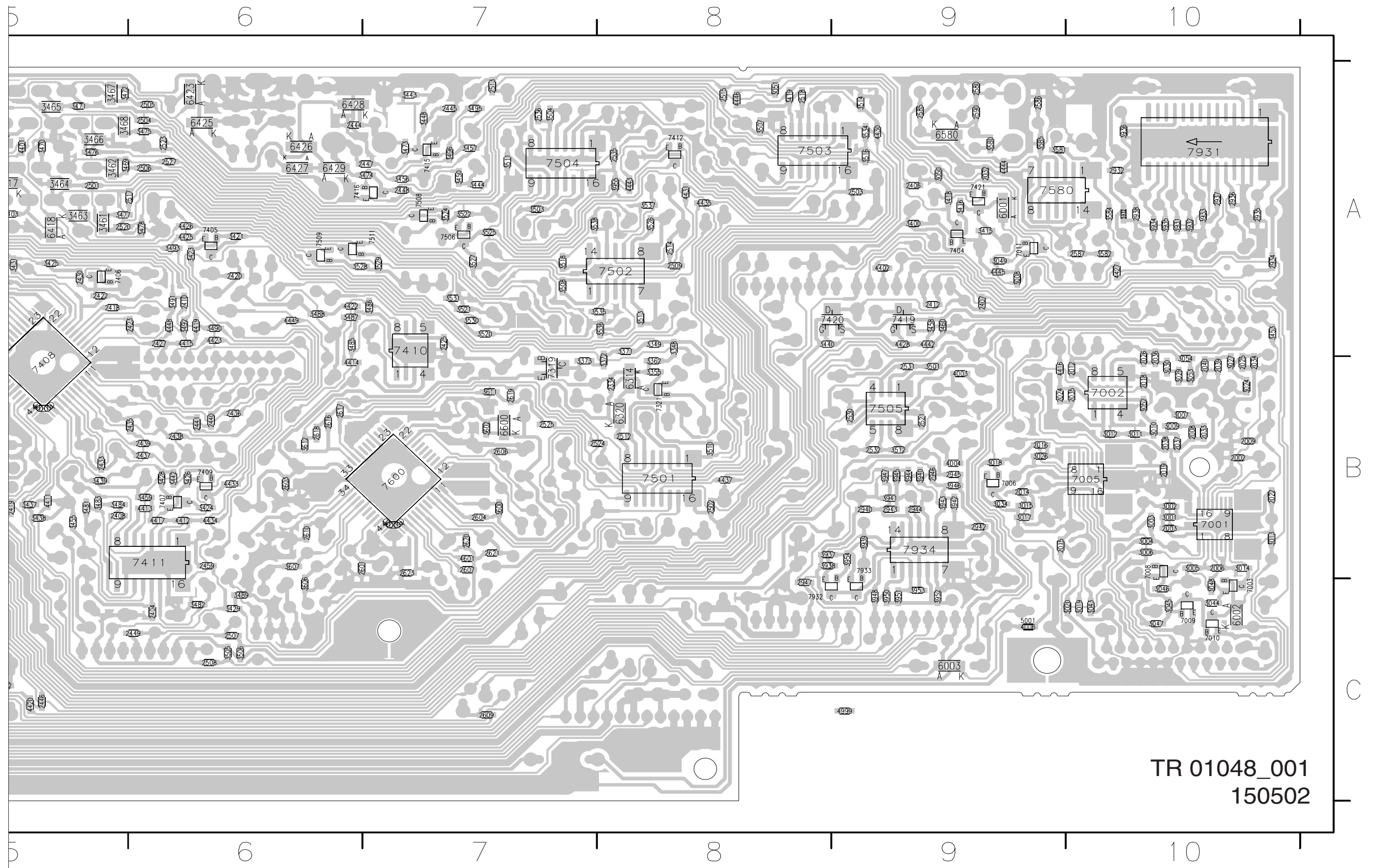




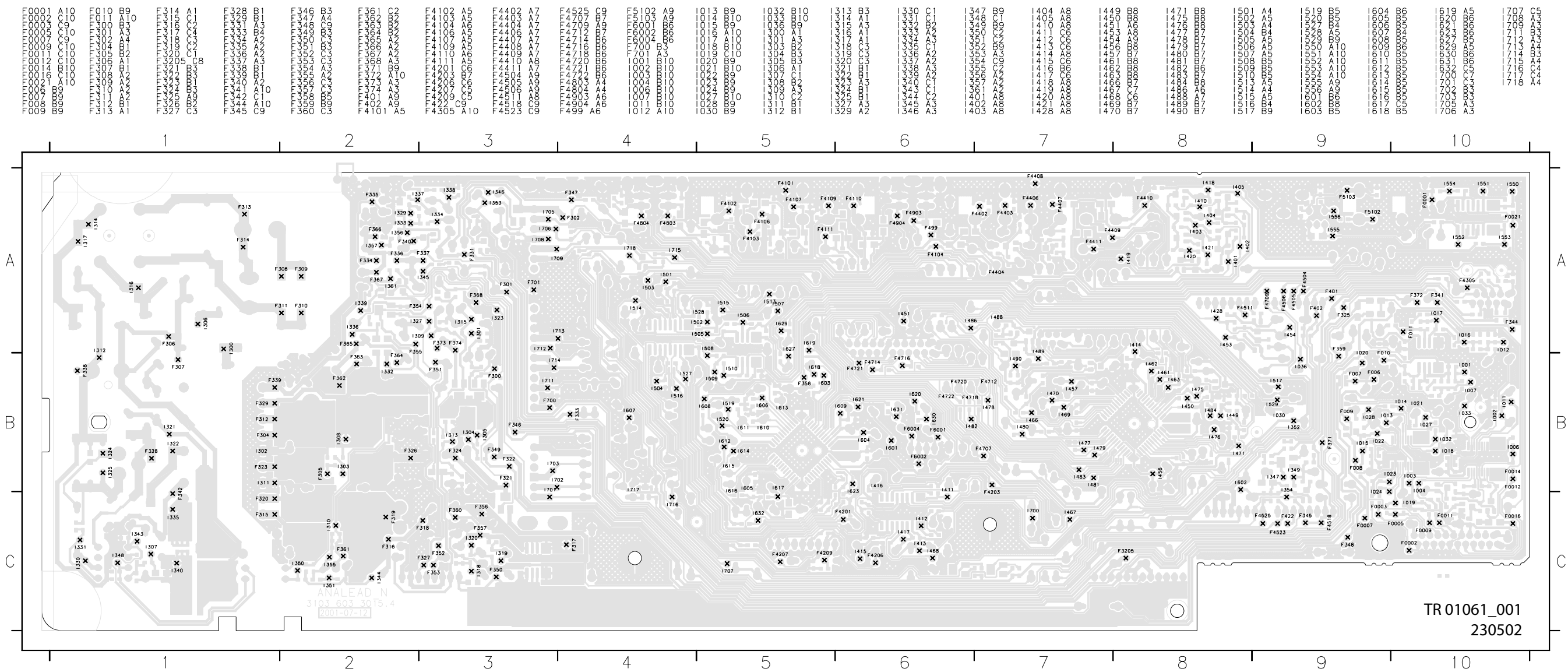
Layout Analog Board (Part 1 Bottom View)



Layout Analog Board (Part 2 Bottom View)



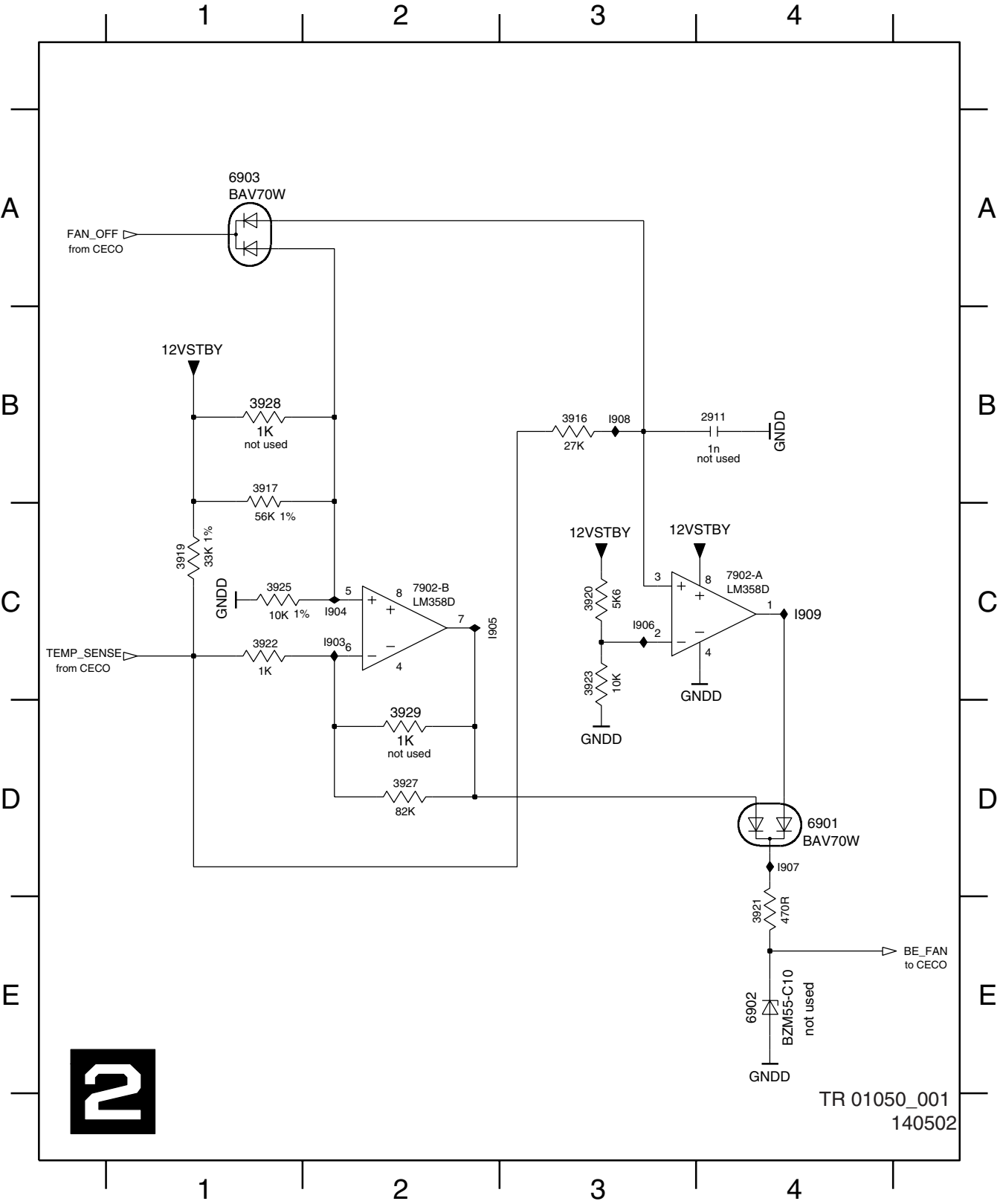
Test points overview Analog Board



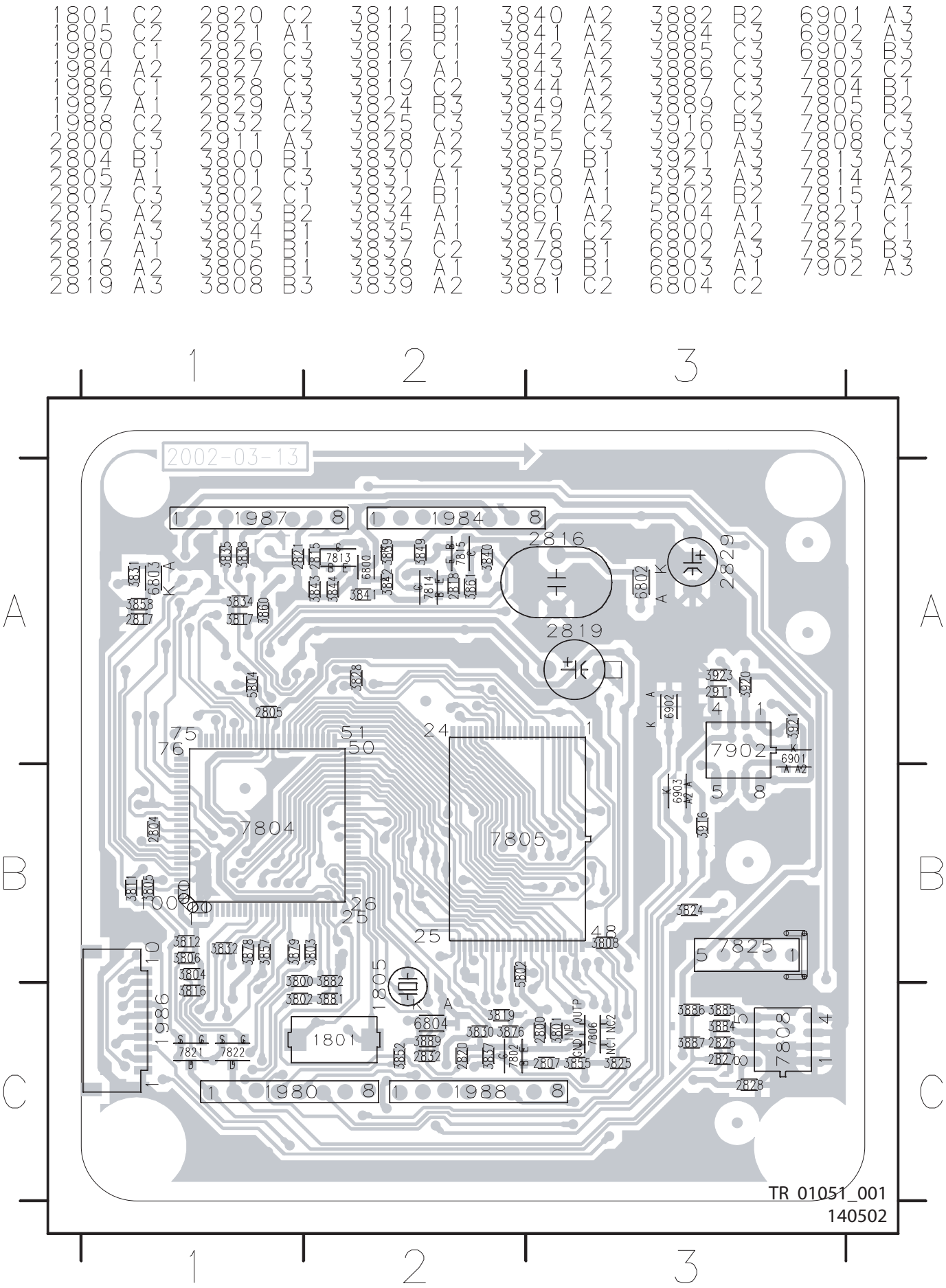
TR 01049_001
140502

UPC12 Sub PCB: Fan Control (FACO)

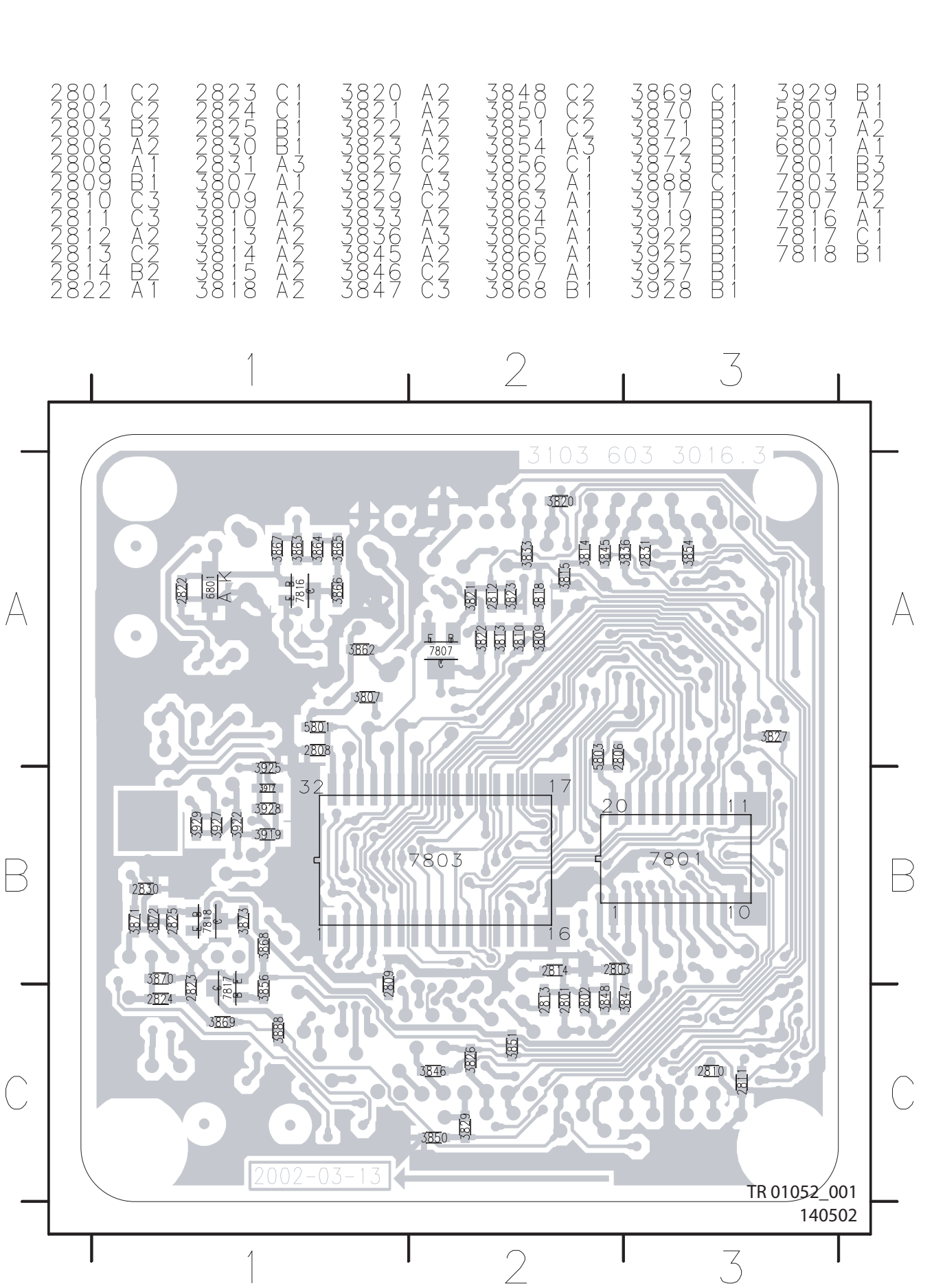
2911 B4	3919 C1	3922 C1	3927 D2	6901 D4	7902-A C4	I904 C2	I907 D4
3916 B3	3920 C3	3923 C3	3928 B1	6902 E4	7902-B C2	I905 C2	I908 B3
3917 B1	3921 E4	3925 C1	3929 D2	6903 A1	I903 C2	I906 C3	I909 C4



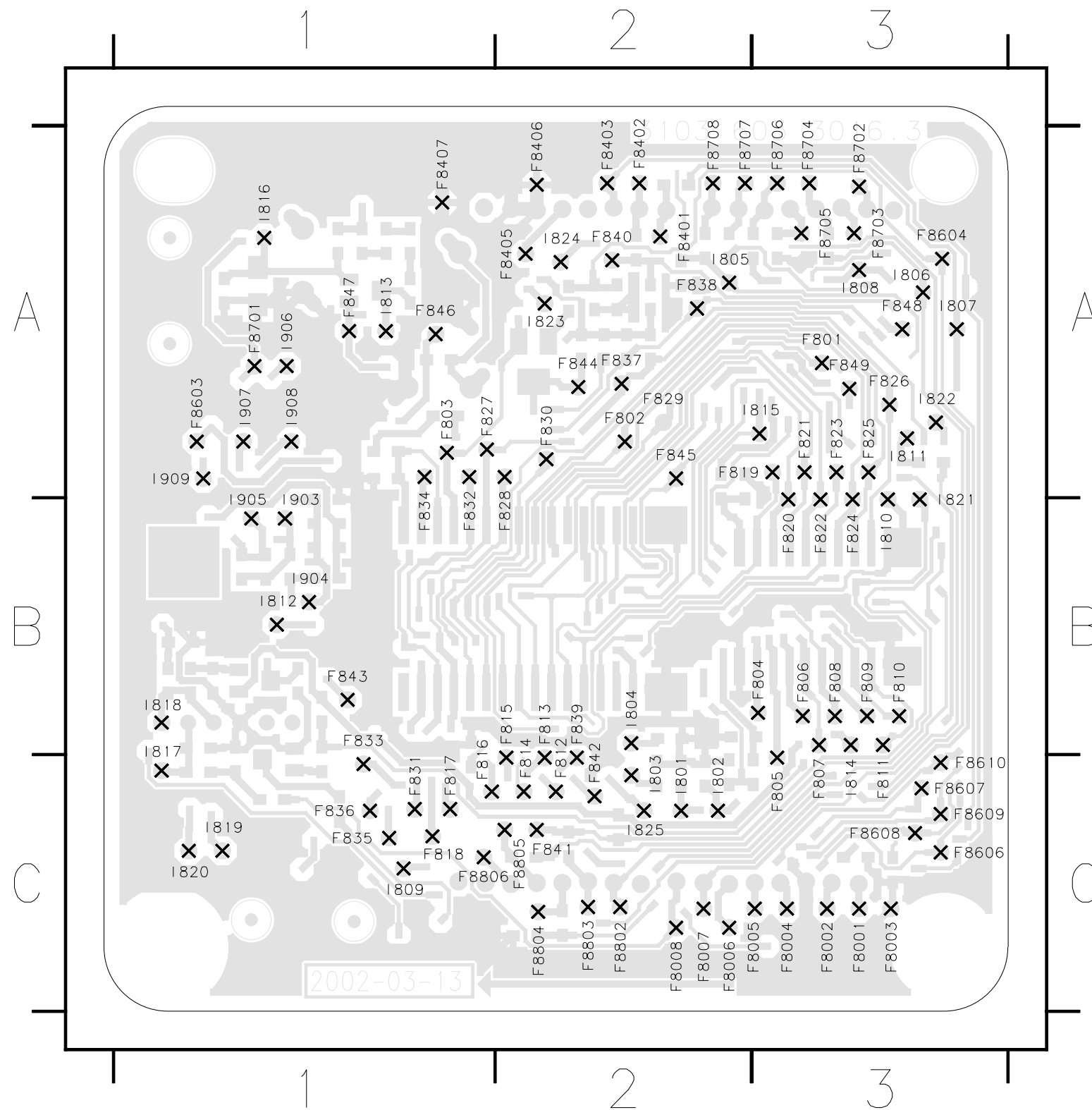
Layout UPC 12 Sub PCB (Top View)



Layout UPC 12 Sub PCB (Bottom View)

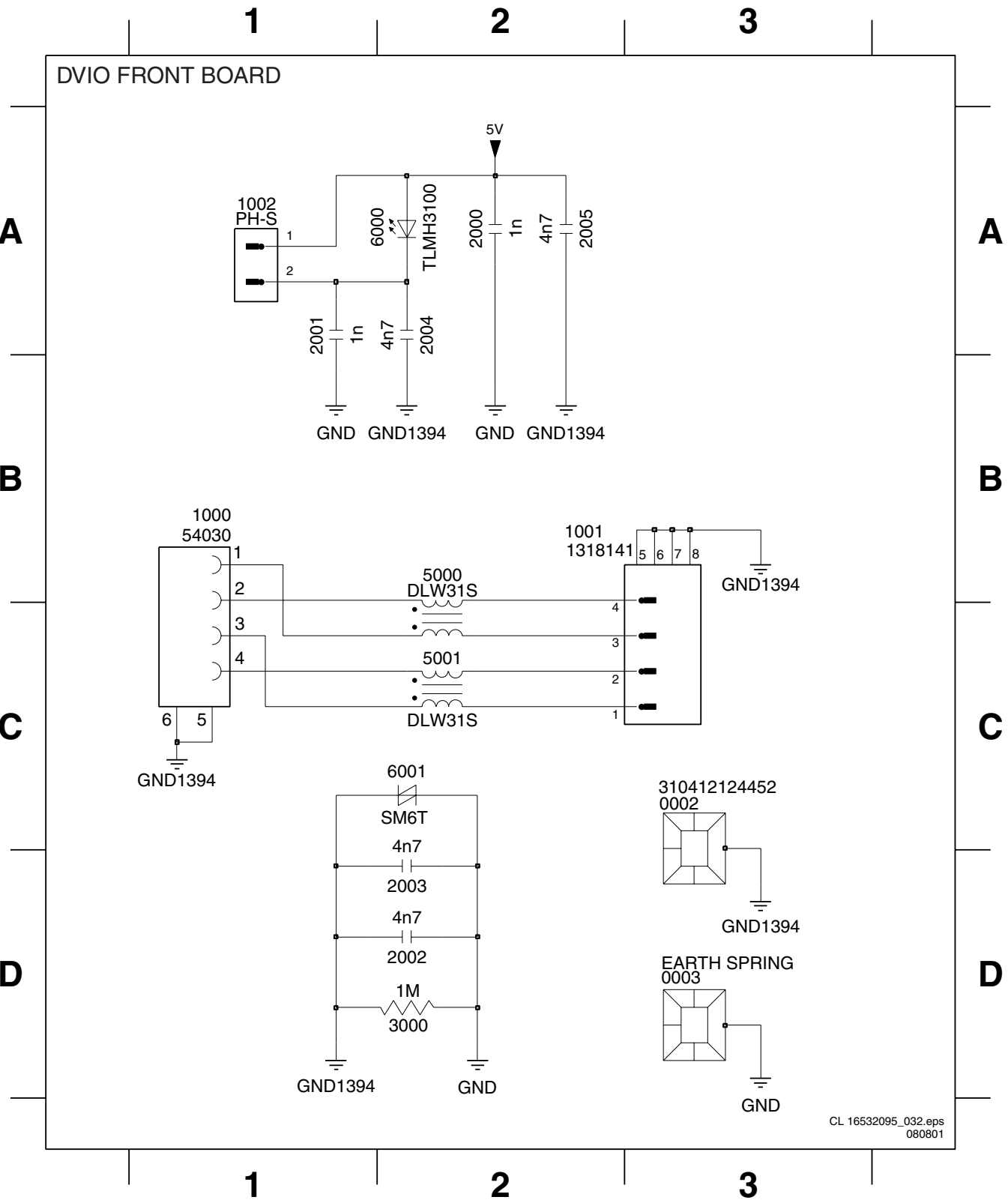


Tests points overview UPC12 Sub PCB

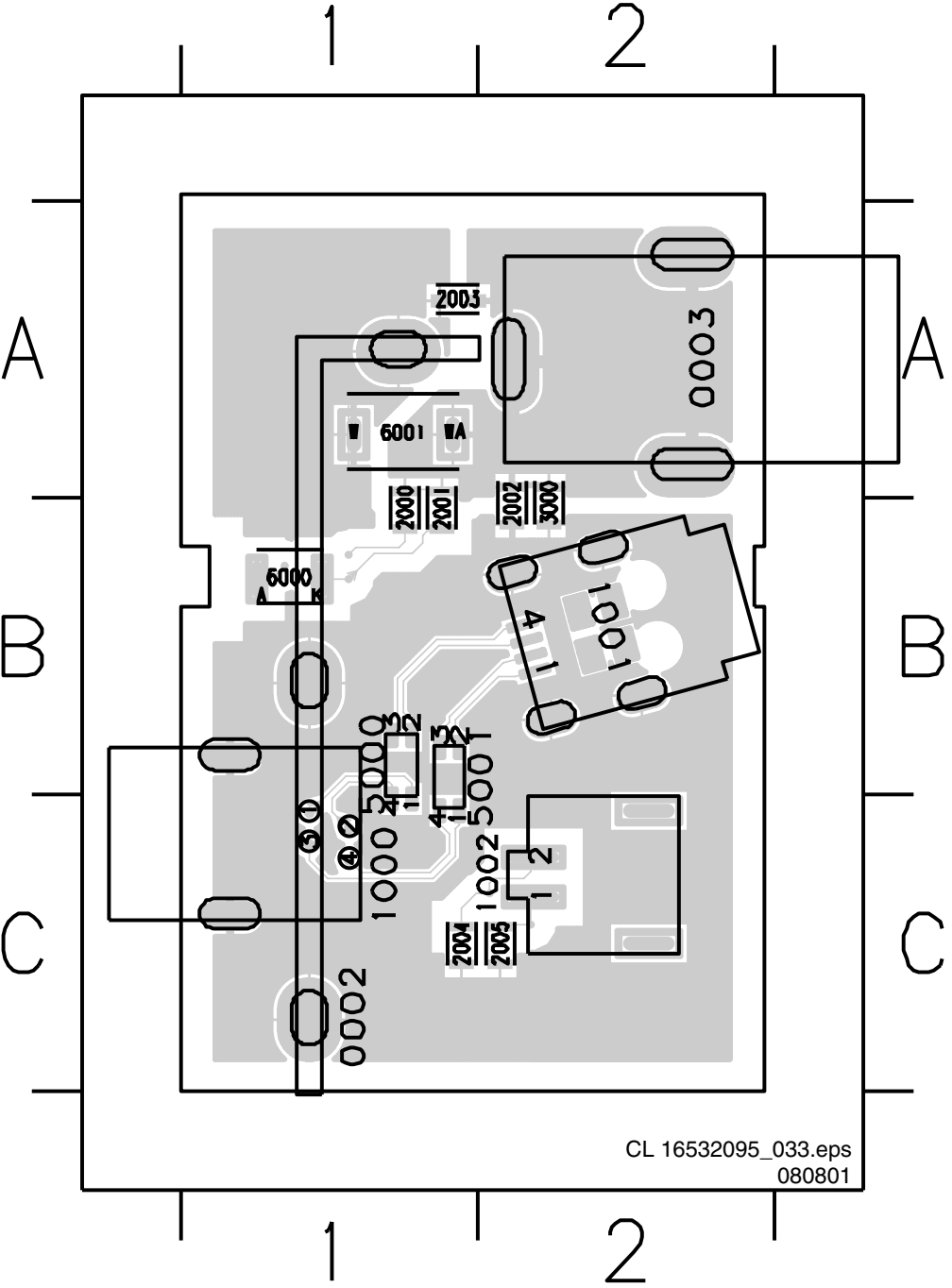
[illegible][illegible][illegible]

DVIO Front Board

0002 C3 1000 B1 1002 A1 2001 A1 2003 D2 5000 B2 6000 A2
0003 D3 1001 B2 2000 A2 2002 D2 3000 D2 5001 C2 6001 C2

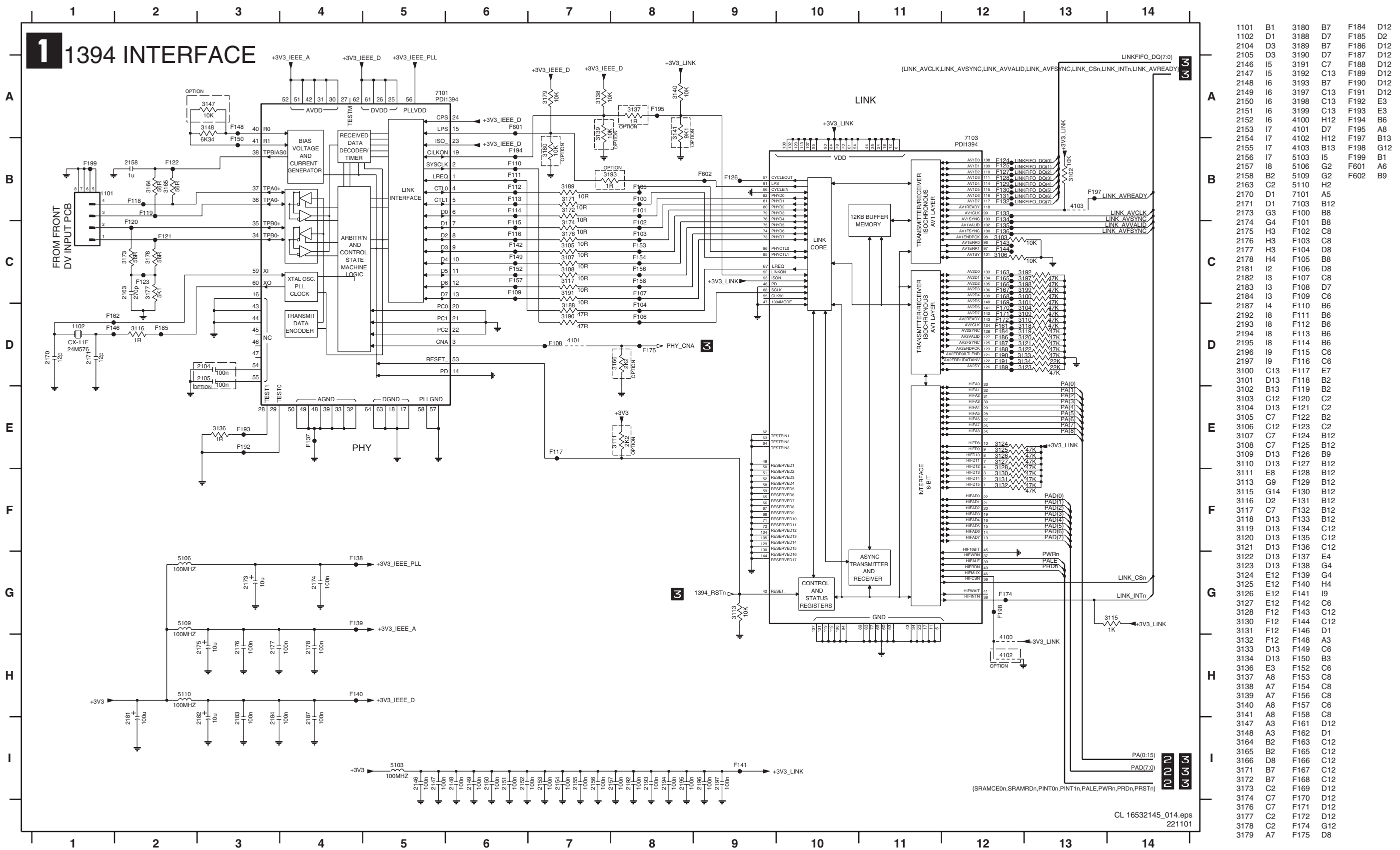


Layout DVIO Front Board

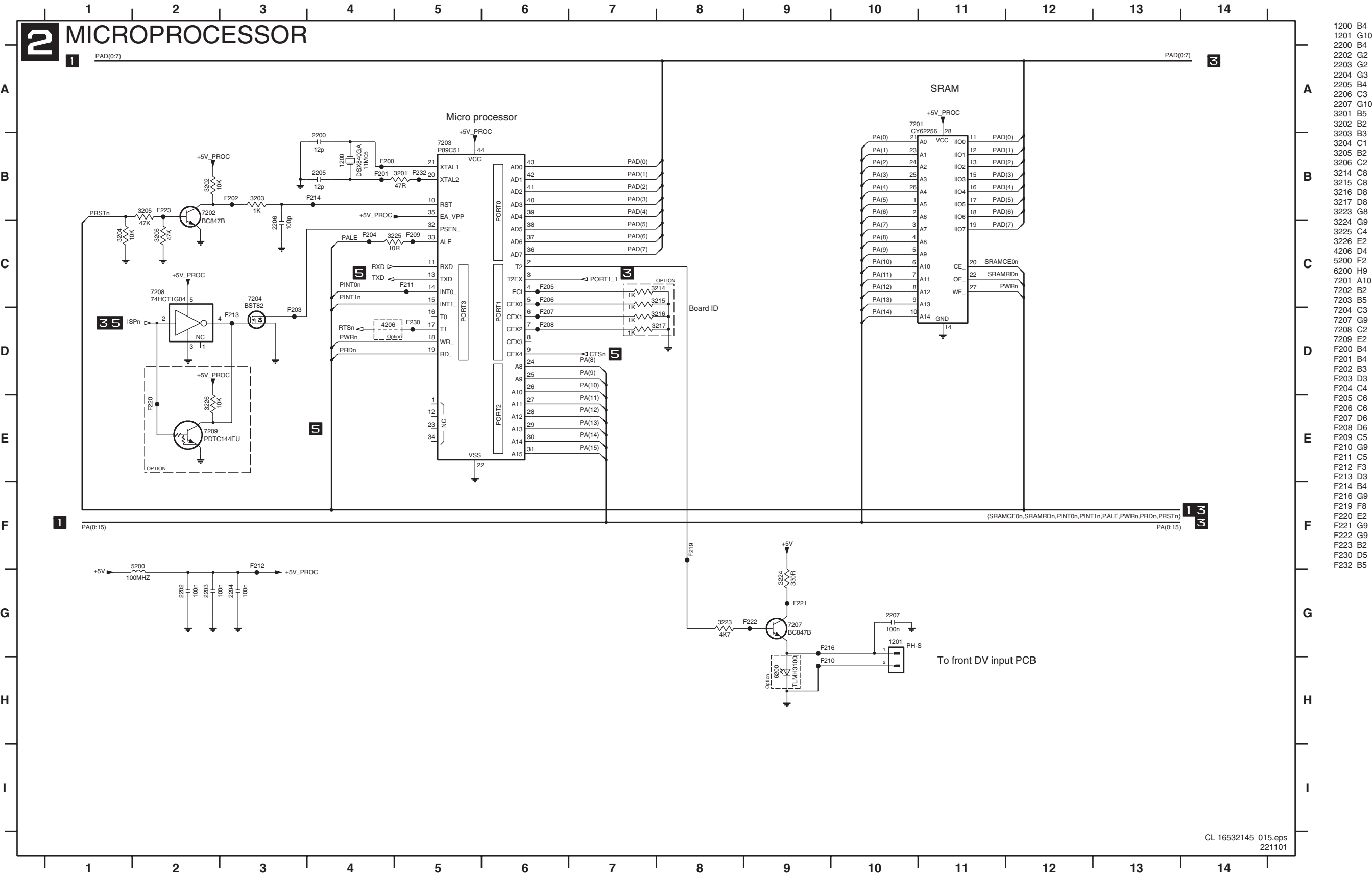


0002 C1
0003 A2
1000 C1
1001 B2
1002 C2
2000 B1
2001 B1
2002 B2
2003 A1
2004 C1
2005 C2
3000 B2
5000 B2
5001 B2
6000 B1
6001 A1

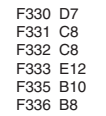
DVIO Board: 1394 Interface



DVIO Board: Microprocessor

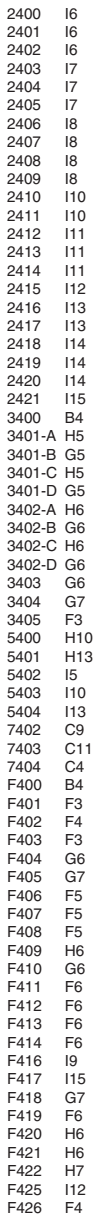


3



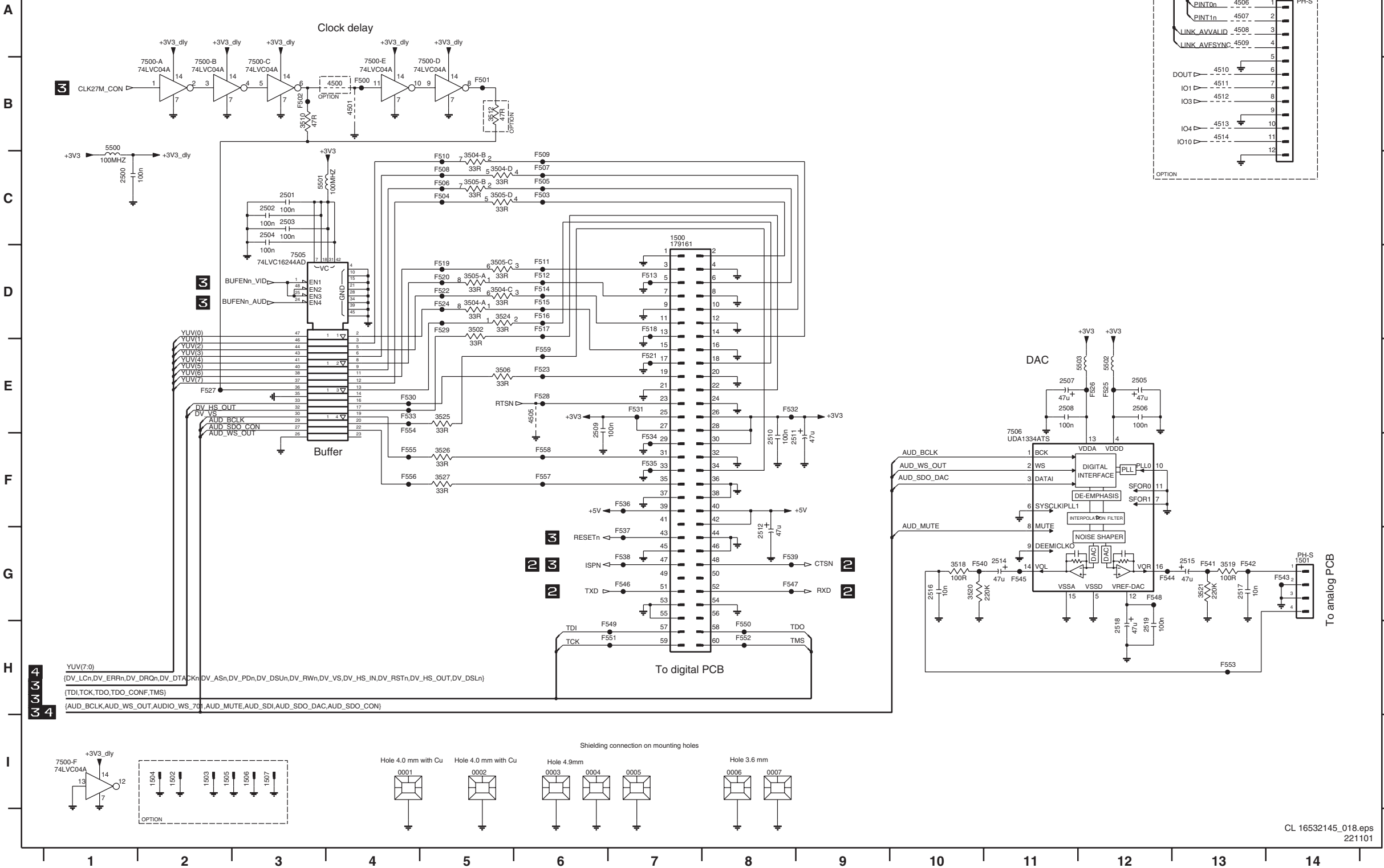
CL 16532145_016.eps
221101

4 DVCODEC



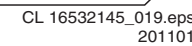
DVIO Board: Audio & Video Output

5 AUDIO & VIDEO OUTPUT

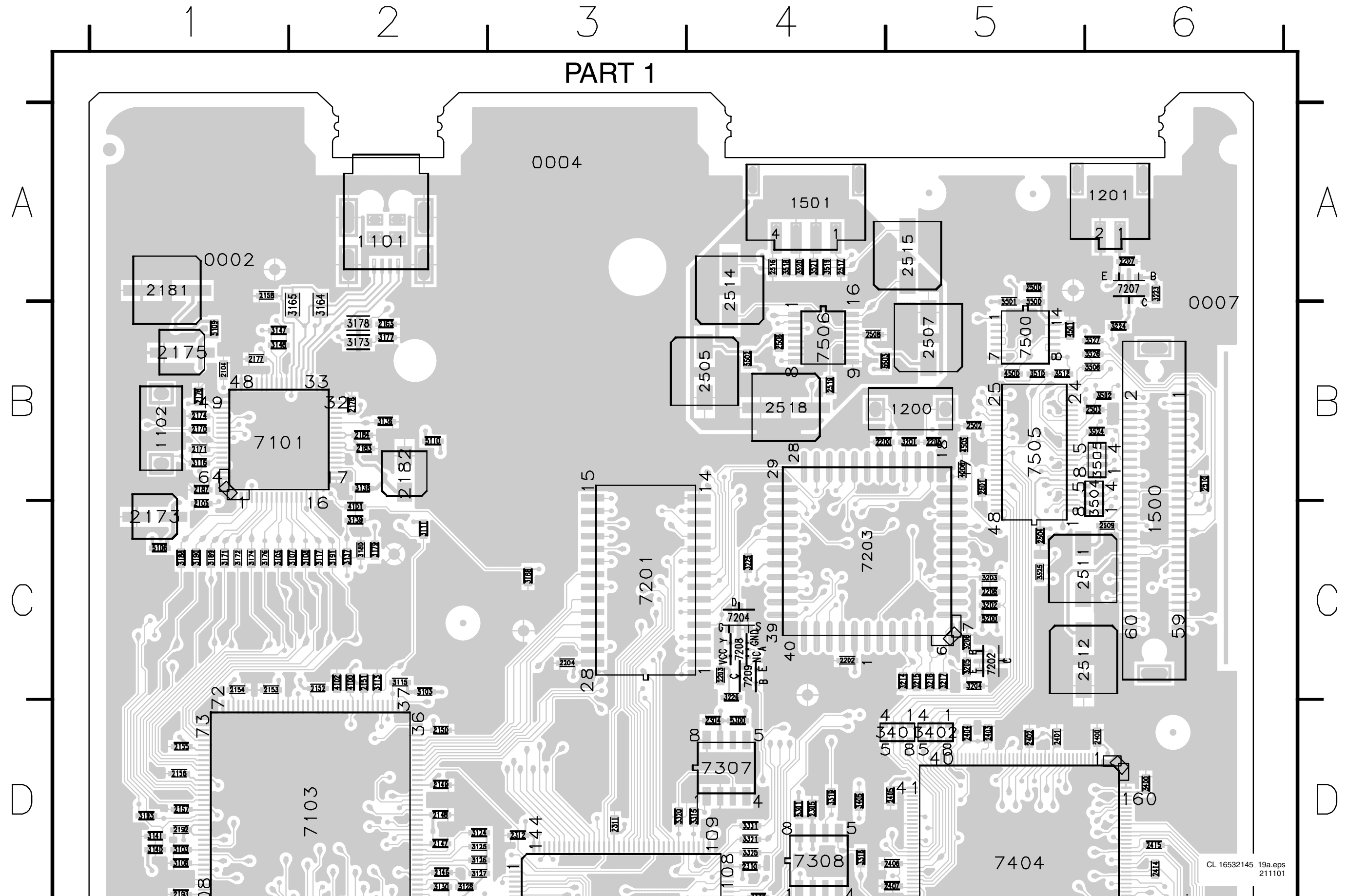


0001	I4	F509	C6
0002	I5	F510	C5
0003	I6	F511	D6
0004	I6	F512	D6
0005	I7	F513	D7
0006	I8	F514	D6
0007	I8	F515	D6
1500	C7	F516	D6
1501	G14	F517	D6
1502	I2	F518	D7
1503	I2	F519	D5
1504	I2	F520	D5
1505	I2	F521	E7
1506	I3	F522	D5
1507	I3	F523	E6
1508	A14	F524	D5
2500	C1	F525	E12
2501	C3	F526	E12
2502	C3	F527	E2
2503	C3	F528	E6
2504	C3	F529	D5
2505	E12	F530	E4
2506	E12	F531	E7
2507	E11	F532	E8
2508	E11	F533	E4
2509	E6	F534	F7
2510	F8	F535	F7
2511	F8	F536	F7
2512	G8	F537	G7
2514	G11	F538	G7
2515	G13	F539	G8
2516	G10	F540	G10
2517	G13	F541	G13
2518	H12	F542	G13
2519	H12	F543	G14
3502	D5	F544	G12
3504-A	D5	F545	G11
3504-B	C5	F546	G7
3504-C	D5	F547	G8
3504-D	C5	F548	G12
3505-A	D5	F549	H7
3505-B	C5	F550	H8
3505-C	D5	F551	H7
3505-D	C5	F552	H8
3506	E5	F553	H13
3510	B3	F554	E4
3511	B4	F555	F4
3512	B5	F556	F4
3518	G10	F557	F6
3519	G13	F558	F6
3520	G10	F559	E6
3521	G13		
3524	D5		
3525	E5		
3526	F5		
3527	F5		
4500	B4		
4505	E6		
4506	A13		
4507	A13		
4508	A13		
4509	A13		
4510	B13		
4511	B13		
4512	B13		
4513	B13		
4514	B13		
5000	B1		
5001	C3		
5002	E12		
5003	E12		
7500-A	B2		
7500-B	B2		
7500-C	B3		
7500-D	B4		
7500-E	B4		
7500-F	I1		
7505	D3		
7506	F11		
F500	B4		
F501	B5		
F502	B3		
F503	C6		
F504	C5		
F505	C6		
F506	C5		
F507	C6		
F508	C5		

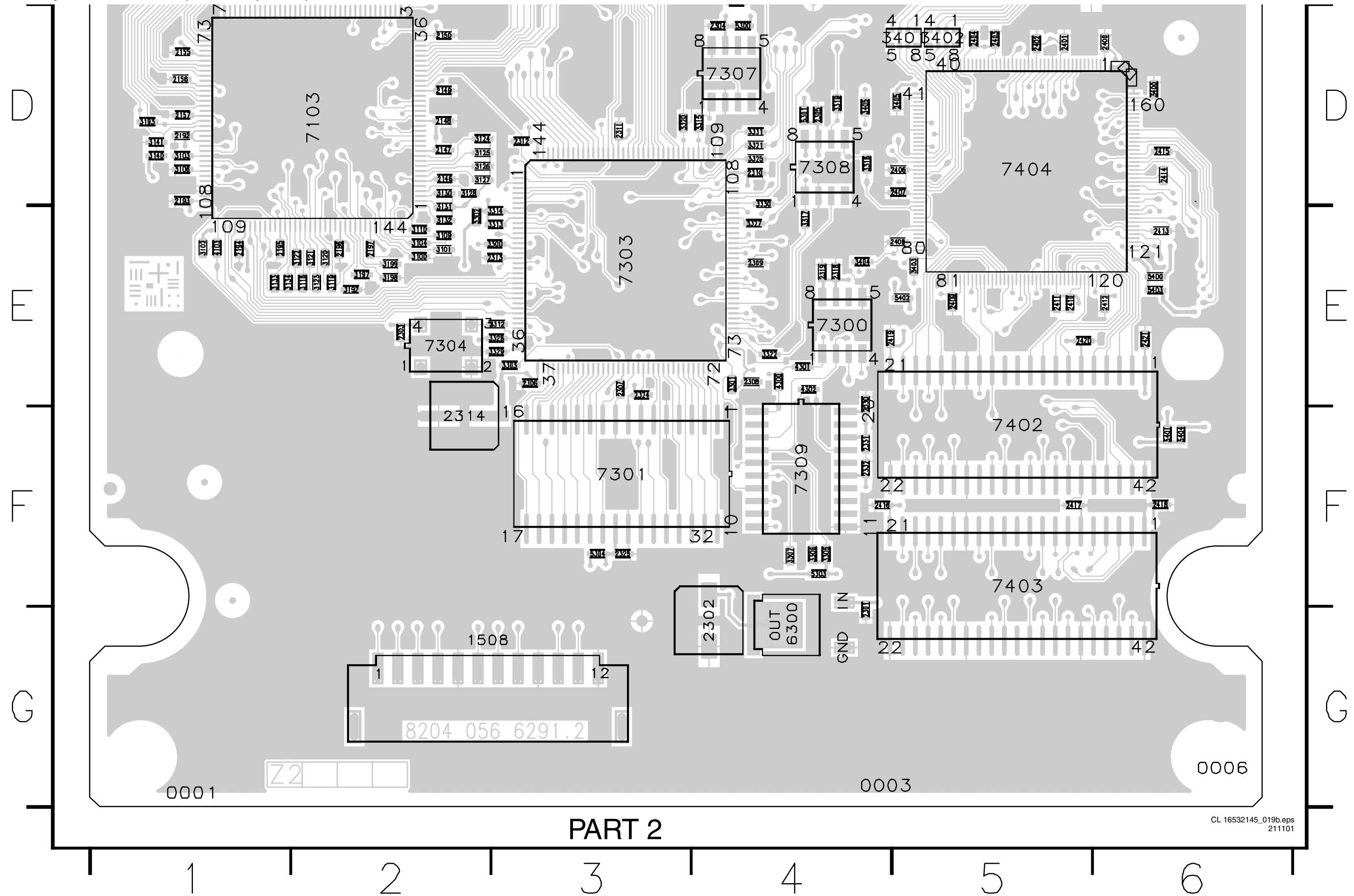
1 2 3 4 5 6

TR 01024_0

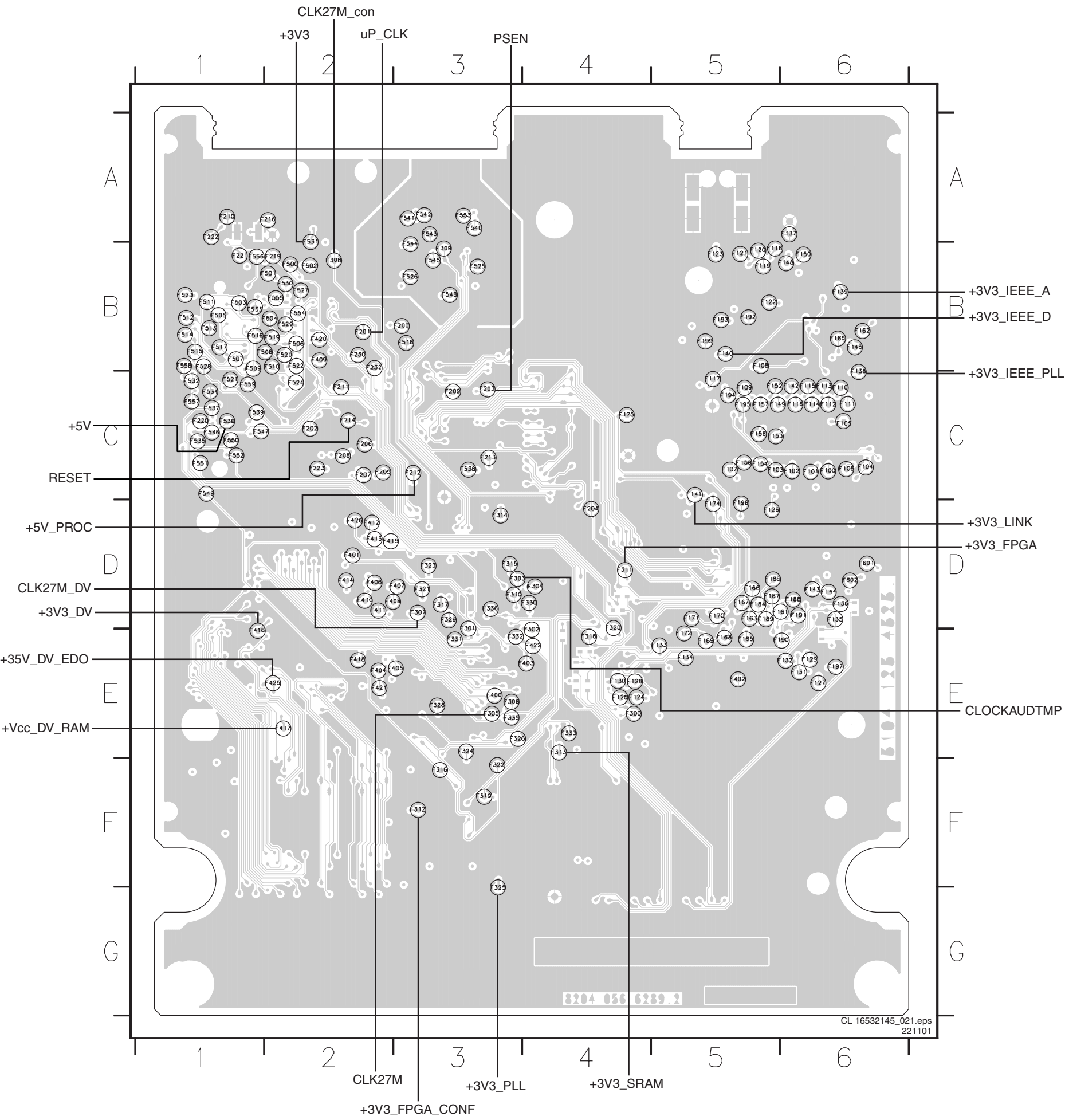
Layout DVIO Board (Part 1 Top View)



Layout DVIO Board (Part 2 Top View)



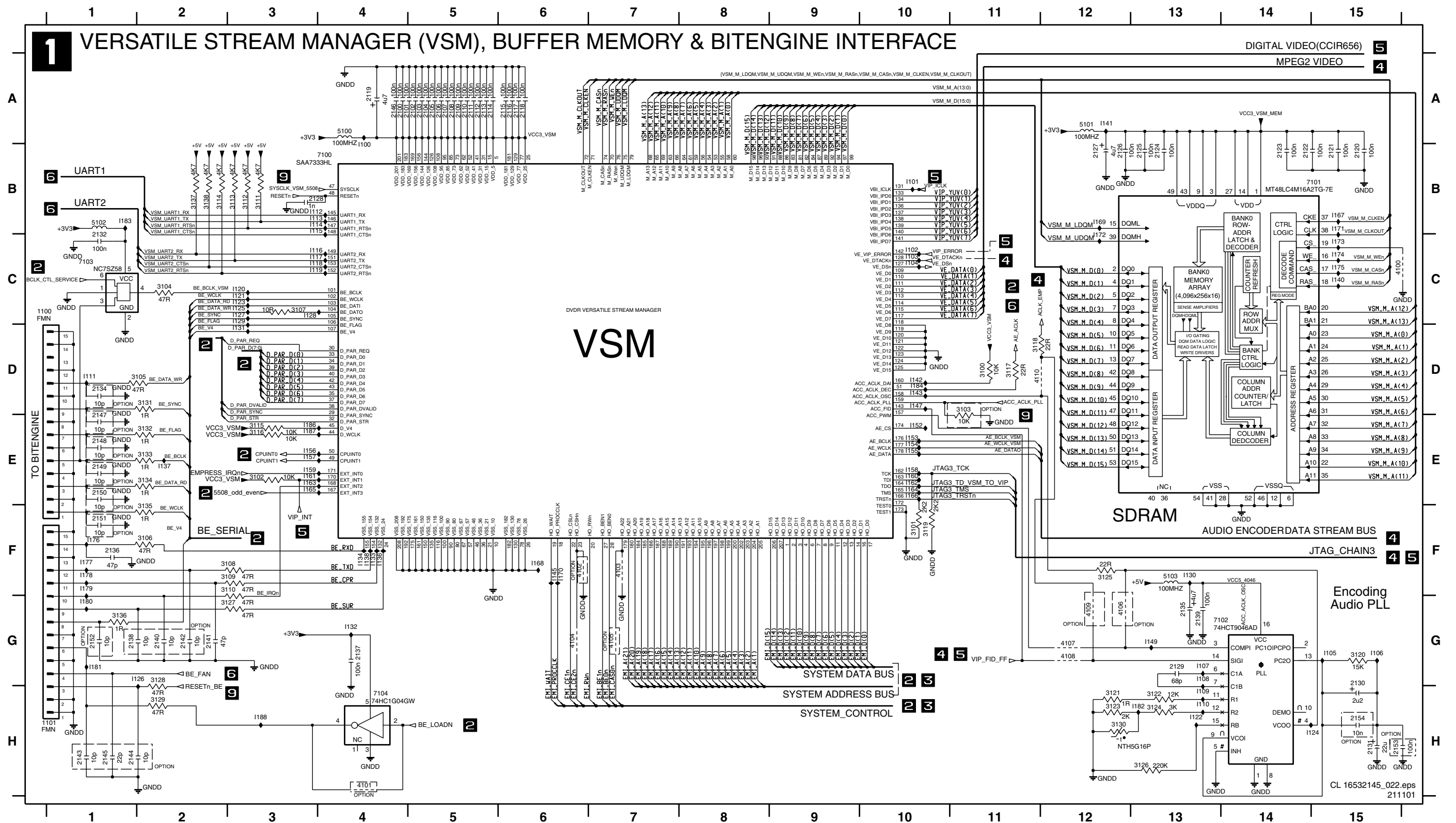
Layout DVIO Board (Testlands Bottom View)



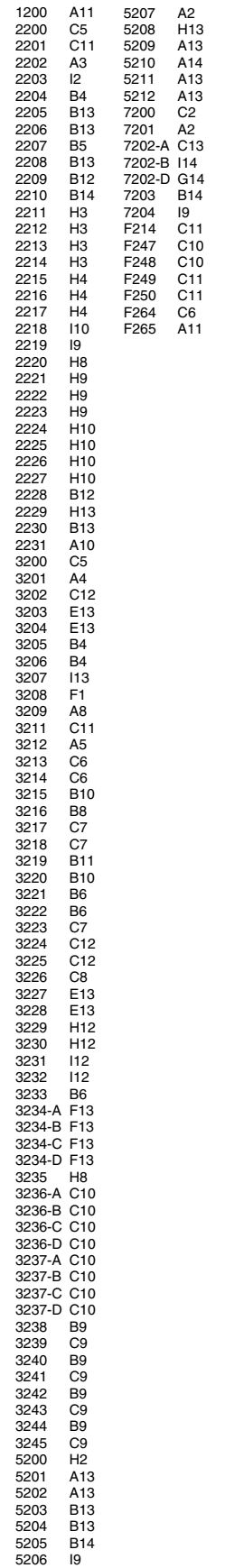
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F100	C6	F146	B6	F206	C2	F329	D3	F513	B1
F101	C6	F146	B6	F207	C2	F329	D3	F514	B1
F101	C6	F148	B6	F207	C2	F330	D4	F514	B1
F102	C6	F148	B6	F208	C2	F330	D4	F515	B1
F102	C6	F149	C5	F208	C2	F331	E3	F515	B1
F103	C5	F149	C5	F209	C3	F331	E3	F516	B1
F103	C5	F150	B6	F209	C3	F332	E3	F516	B1
F104	C6	F150	B6	F210	A1	F332	E3	F517	B1
F104	C6	F152	C5	F210	A1	F333	E4	F517	B1
F105	C6	F152	C5	F211	C2	F333	E4	F518	B3
F105	C6	F153	C5	F211	C2	F335	E3	F518	B3
F106	C6	F153	C5	F212	C3	F335	E3	F519	B2
F106	C6	F154	C5	F212	C3	F336	D3	F519	B2
F107	C5	F154	C5	F213	C3	F336	D3	F520	B2
F107	C5	F156	C5	F213	C3	F400	E3	F520	B2
F108	B5	F156	C5	F214	C2	F400	E3	F521	C1
F108	B5	F157	C5	F214	C2	F401	D2	F521	C1
F109	C5	F157	C5	F216	A2	F401	D2	F522	B2
F109	C5	F158	C5	F216	A2	F402	E5	F522	B2
F110	C6	F158	C5	F219	B2	F402	E5	F523	B1
F110	C6	F161	D6	F219	B2	F403	E4	F523	B1
F111	C6	F161	D6	F220	C1	F403	E4	F524	C2
F111	C6	F162	B6	F220	C1	F404	E2	F524	C2
F112	C6	F162	B6	F221	B1	F404	E2	F525	B3
F112	C6	F163	D5	F221	B1	F405	E3	F525	B3
F113	C6	F163	D5	F222	A1	F405	E3	F526	B3
F113	C6	F165	E5	F222	A1	F406	D2	F526	B3
F114	C6	F165	E5	F223	C2	F406	D2	F527	B2
F114	C6	F166	D5	F223	C2	F407	D3	F527	B2
F115	C6	F166	D5	F230	B2	F407	D3	F528	B1
F115	C6	F167	D5	F230	B2	F408	D2	F528	B1
F116	C6	F167	D5	F232	B2	F408	D2	F529	B2
F116	C6	F168	E5	F232	B2	F409	B2	F529	B2
F117	C5	F168	E5	F300	E4	F409	B2	F530	B2
F117	C5	F169	E5	F300	E4	F410	D2	F530	B2
F118	B5	F169	E5	F301	D3	F410	D2	F531	A2
F118	B5	F170	D5	F301	D3	F411	D2	F531	B2
F119	B5	F170	D5	F302	E4	F411	D2	F532	C1
F119	B5	F171	D5	F302	E4	F412	D2	F532	C1
F120	B5	F171	D5	F303	D3	F412	D2	F533	B1
F120	B5	F172	E5	F303	D3	F413	D2	F533	B1
F121	B5	F172	E5	F304	D4	F413	D2	F534	C1
F121	B5	F174	D5	F304	D4	F414	D2	F534	C1
F122	B5	F174	D5	F305	E3	F414	D2	F535	C1
F122	B5	F175	C4	F305	E3	F416	E1	F535	C1
F123	B5	F175	C4	F306	E3	F416	E1	F536	C1
F123	B5	F184	D5	F306	E3	F417	E2	F536	C1
F124	E4	F184	D5	F307	D3	F417	E2	F537	C1
F124	E4	F185	B6	F307	D3	F418	E2	F537	C1
F125	E4	F185	B6	F308	B2	F418	E2	F538	C3
F125	E4	F186	D5	F308	B2	F419	D2	F538	C3
F126	D5	F186	D5	F309	B3	F419	D2	F539	C1
F126	D5	F187	D5	F309	B3	F420	B2	F539	C1
F127	E6	F187	D5	F310	D3	F420	B2	F540	A3
F127	E6	F188	D6	F310	D3	F421	E2	F540	A3
F128	E4	F188	D6	F311	D4	F421	E2	F541	A3
F128	E4	F189	D5	F311	D4	F422	E4	F541	A3
F129	E6	F189	D5	F312	F3	F422	E4	F542	A3
F129	E6	F190	E6	F312	F3	F425	E2	F542	A3
F130	E4	F190	E6	F313	E4	F425	E2	F543	A3
F130	E4	F191	D6	F313	E4	F426	D2	F543	A3
F131	E6	F191	D6	F314	D3	F426	D2	F544	B3
F131	E6	F192	B5	F314	D3	F500	B2	F544	B3
F132	E6	F192	B5	F315	D3	F500	B2	F545	B3
F132	E6	F193	B5	F315	D3	F501	B2	F545	B3
F133	E5	F193	B5	F316	F3	F501	B2	F546	C1
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F134	E5	F194	C5	F317	D3	F502	B2	F547	C1
F134	E5	F195	C5	F317	D3	F503	B1	F547	C1
F135	D6	F195	C5	F318	E4	F503	B1	F548	B3
F135	D6	F197	E6	F318	E4	F504	B2	F548	B3
F136	D6	F197	E6	F319	F3	F504	B2	F549	C1
F136	D6	F198	D5	F319	F3	F505	B1	F549	C1
F137	A6	F198	D5	F320	D4	F505	B1	F550	C1
F137	A6	F199	B5	F320	D4	F506	B2	F550	C1
F138	C6	F199	B5	F321	D3	F506	B2	F551	C1
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F140	B5	F202	C2	F323	D3	F509	B1	F553	A3
F141	C5	F202	C2	F324	E3	F509	B1	F554	B2
F141	C5	F203	C3	F324	E3	F510	B2	F554	B2
F142	C6	F203	C3	F325	G3	F510	B2	F555	B2
F142	C6	F204	D4	F325	G3	F511	B1	F555	B2
F143	D6	F204	D4	F326	E3	F511	B1	F556	B1
F143	D6	F205	C2	F326	E3	F512	B1	F556	B1
F144	D6	F205	C2	F328	E3	F512	B1	F557	C1

Digital Board: VSM, Buffer Memory and Bit Engine Interface

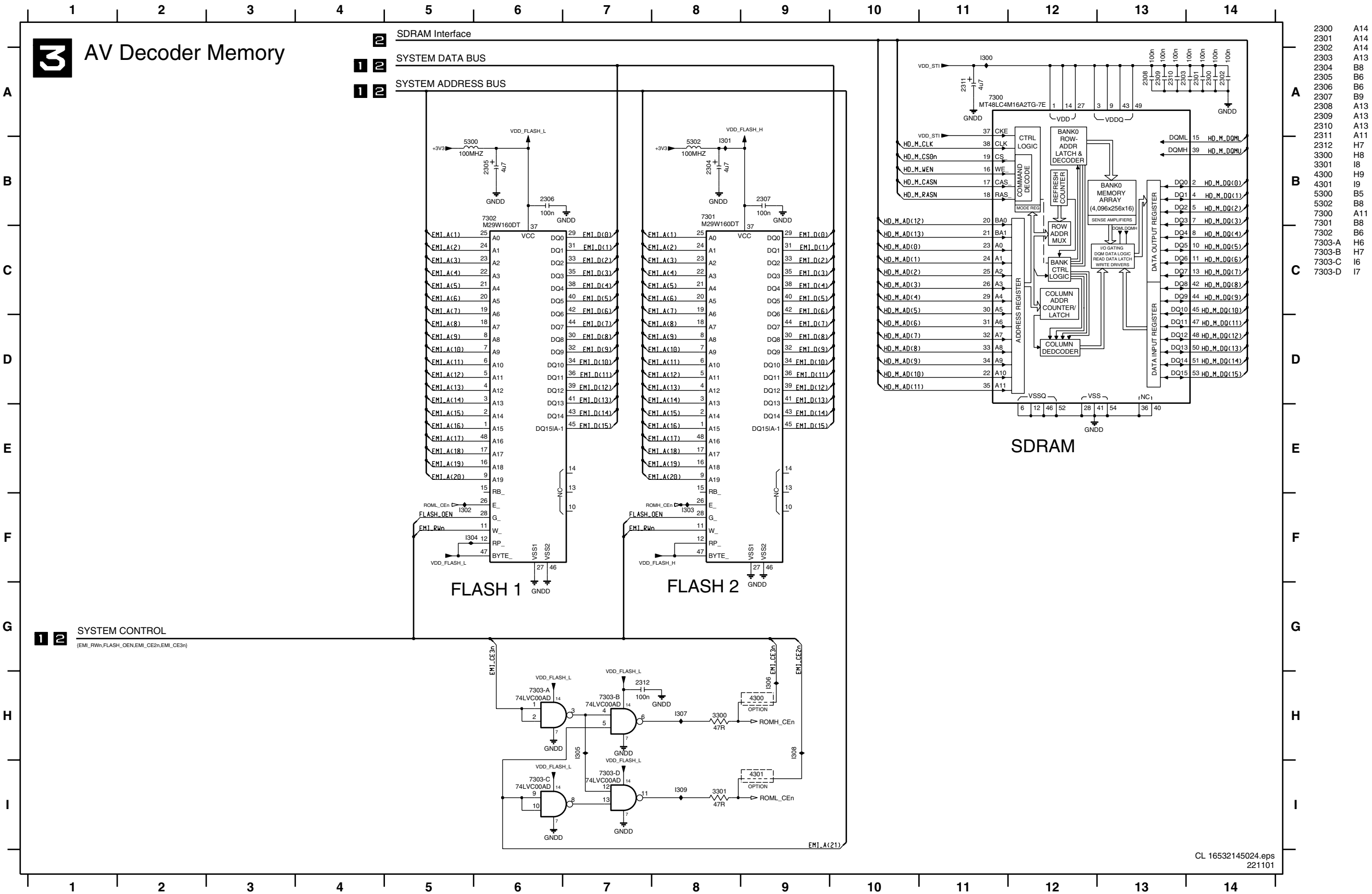
2100	C1	2106	A5	2114	A5	2122	B14	2130	G15	2139	G13	2147	D1	3102	E3	3110	F3	3118	D11	3126	H12	3134	E2	4103	F7	7101	G14
2101	H1	2107	A5	2115	A6	2123	B14	2131	H15	2140	G2	2148	E1	3103	D11	3111	B3	3119	F10	3127	G3	3135	E2	4104	G6	7102	G3
2100	A4	2108	A5	2116	A6	2124	B13	2132	B1	2141	G2	2149	E1	3104	C2	3112	B3	3120	G15	3128	G2	3136	G1	4105	G7	7103	C1
2101	A5	2109	A5	2117	A6	2125	B13	2134	D1	2142	G2	2150	E1	3105	D2	3113	B3	3121	G12	3129	H2	3137	B2	5100	A4	7104	H4
2102	A5	2110	A5	2118	A6	2126	B12	2135	G13	2143	H1	2151	F1	3106	F2	3114	B2	3122	H12	3130	H12	3138	B2	5101	A12		
2103	A5	2111	A5	2119	A4	2127	B12	2136	F1	2144	H1	2152	G1	3107	C3	3115	E3	3123	H12	3131	D2	4100	C15	5102	B1		
2104	A5	2112	A5	2120	B15	2128	B3	2137	G4	2145	H1	3100	D11	3108	F3	3116	E3	3124	H12	3132	E2	4101	H4	5103	F13		
2105	A5	2113	A5	2121	B15	2129	G13	2138	G1	2146	A4	3101	F10	3109	F3	3117	D11	3125	G14	3133	E2	4102	F6	7100	B4		



2 AV decoder : STI5508

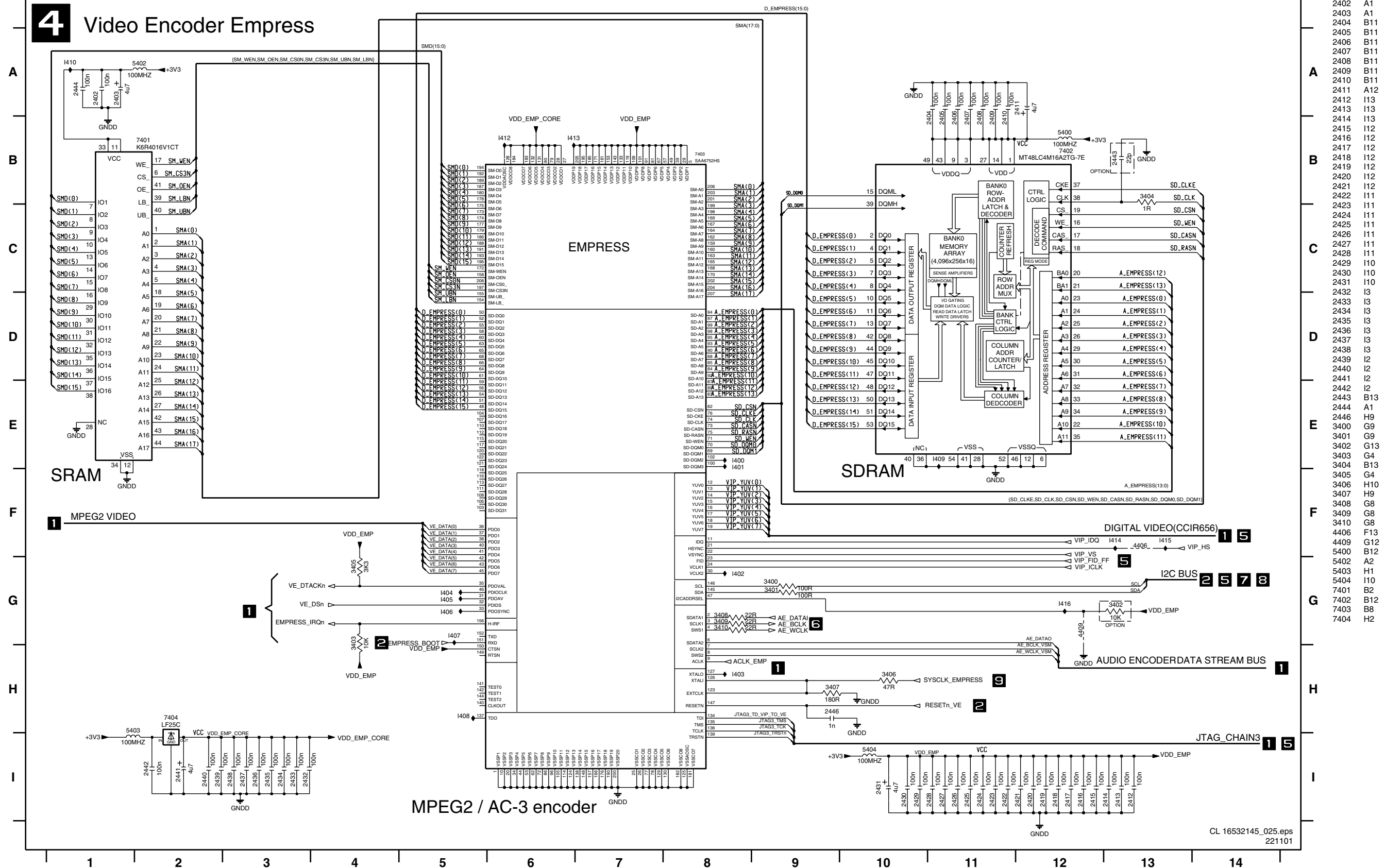


Digital Board: AV Decoder Memory

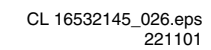


Digital Board: Video Encoder, Empress

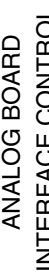
4 Video Encoder Empress



5 VIP CVBS Y/C Video Input

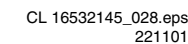


6 Analog Board Cons. Video In / Output



1600	H14	7202-C	D12
1601	D14	7600	E6
1602	C14	7601	G10
1603	E2	7602	B3
2600	E6	7603	G6
2601	E5	7604	I10
2602	E5	7605	I6
2603	C12	7606	E10
2604	C13		
2605	E10		
2606	E9		
2607	E9		
2608	A6		
2609	A6		
2610	G6		
2611	G5		
2612	G5		
2613	A9		
2614	B9		
2615	F10		
2616	G9		
2617	G9		
2618	A9		
2619	C9		
2620	H6		
2621	I5		
2622	I5		
2623	C12		
2624	C12		
2625	H10		
2626	I9		
2627	I9		
2628	C6		
2629	A6		
2630	A2		
2631	C12		
2632	A2		
2633	B9		
2634	B2		
2635	C9		
2636	H9		
3600	D13		
3601	E5		
3602	E6		
3603	F6		
3604	B12		
3605	A10		
3606	E8		
3607	E9		
3608	F10		
3609	A9		
3610	C10		
3611	G5		
3612	G6		
3613	H6		
3614	C9		
3615	B3		
3616	G8		
3617	G9		
3618	G10		
3619	B2		
3620	F1		
3621	I5		
3622	I6		
3623	A12		
3624	I6		
3625	A12		
3626	I8		
3627	I9		
3628	I10		
3629	A6		
3630	C6		
3631	B10		
3632	B6		
3633	C6		
3634	B9		
3635	B12		
3636	B2		
3637	B12		
3638	B3		
4600	G3		
4601	G1		
4602	G3		
5600	E5		
5601	G9		
5602	I5		
5603	G5		
5604	I9		
5605	E9		
5606	A2		
5607	H9		

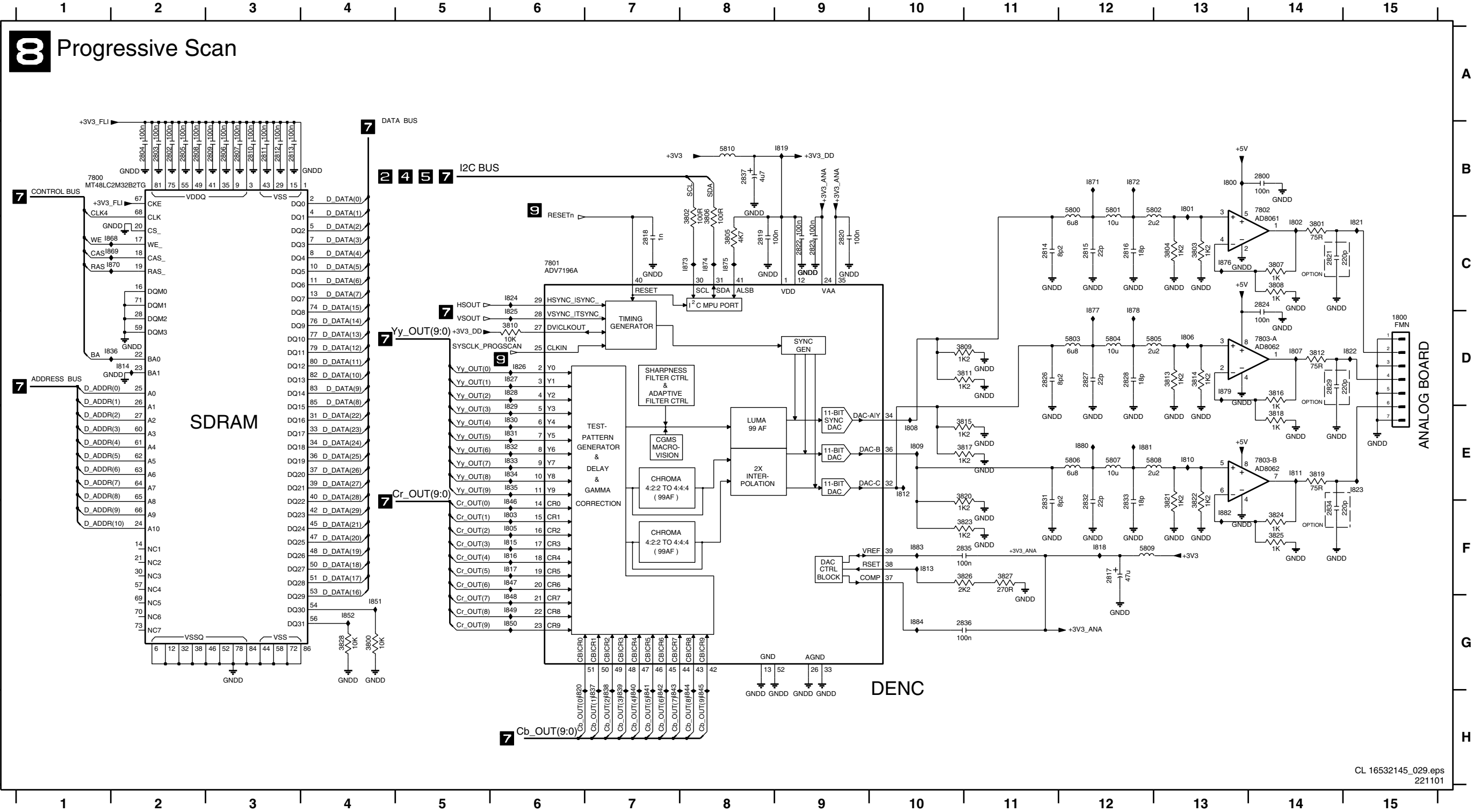
7 Progressive Scan



2700	B9	3719-A	H9
2701	B8	3719-B	H8
2702	B9	3719-C	H8
2703	B9	3719-D	H8
2704	B9	3720	F6
2705	B8	4700	A1
2706	B8	4701	B1
2707	G3	4702	E2
2708	B8	5700	B11
2709	B8	5701	A3
2710	B8	5702	B6
2711	B8	7700	B7
2712	B8	7701-A	E1
2713	B8	7701-B	C1
2714	F13	7702-A	E3
2715	B6	7702-D	C3
2716	B7	7703	A2
2717	B8		
2718	B8		
2719	B8		
2720	B11		
2721	E2		
2722	E3		
2723	B3		
2724	B2		
2725	B2		
2726	B3		
2727	B8		
3700	G11		
3701-A	F11		
3701-B	F11		
3701-C	F11		
3701-D	F11		
3702-A	G11		
3702-B	F11		
3702-C	F11		
3702-D	F11		
3703-A	F6		
3703-B	F6		
3703-C	F6		
3703-D	F6		
3704-A	F6		
3704-B	F6		
3704-C	F6		
3704-D	F6		
3705	G11		
3706	G11		
3707	H11		
3708	H11		
3709-A	E6		
3709-B	E6		
3709-C	F6		
3709-D	F6		
3710-A	G6		
3710-B	G6		
3710-C	E6		
3710-D	E6		
3711-A	G6		
3711-B	G6		
3711-C	G6		
3711-D	G6		
3712	F3		
3713-A	G6		
3713-B	G6		
3713-C	G6		
3713-D	G6		
3714	G11		
3715-A	H7		
3715-B	H7		
3715-C	H7		
3715-D	H7		
3716-A	H8		
3716-B	H8		
3716-C	H8		
3716-D	H7		
3717-A	H8		
3717-B	H8		
3717-C	H8		
3717-D	H8		
3718-A	H8		
3718-B	H8		
3718-C	H8		
3718-D	H8		

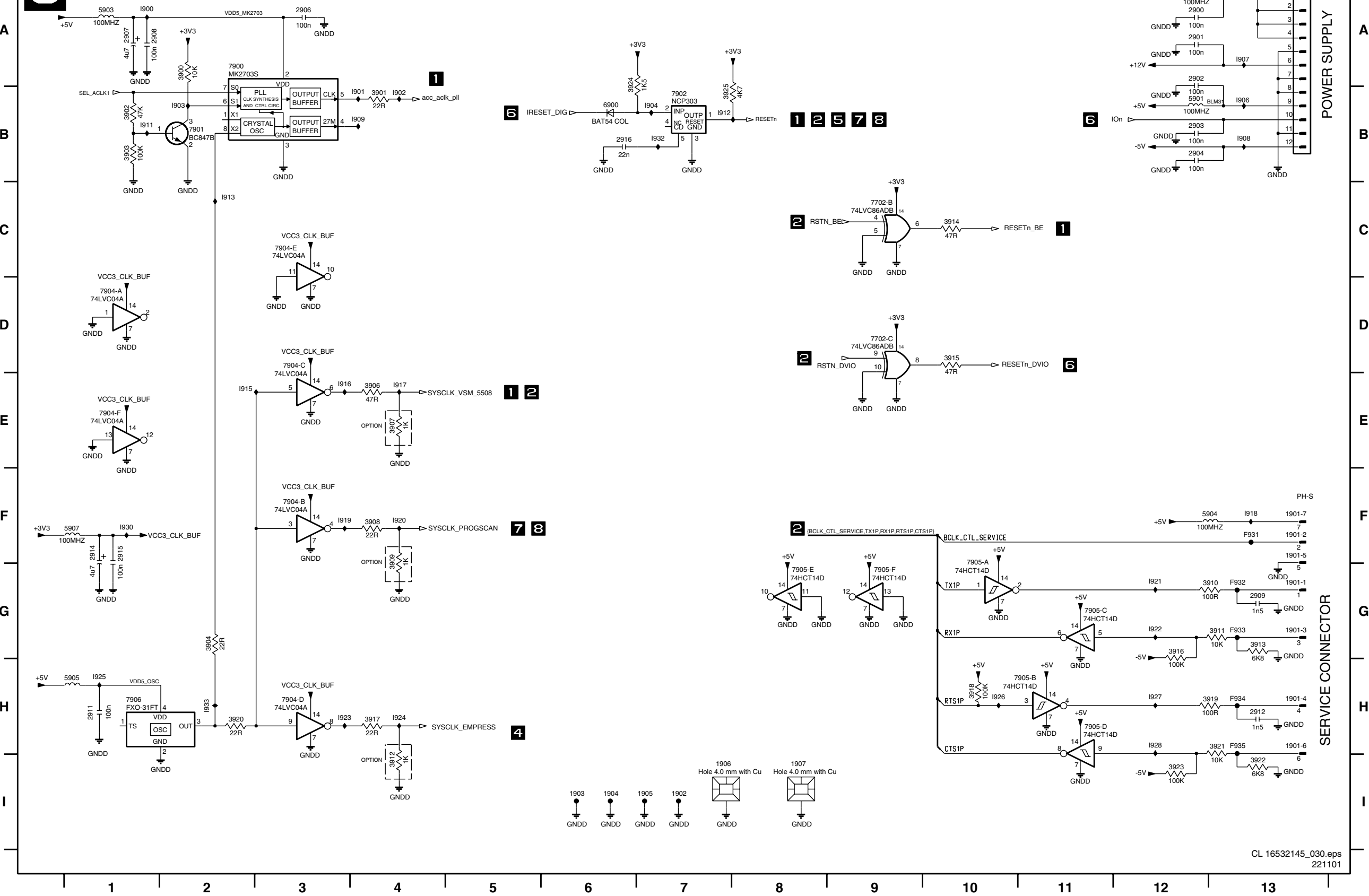
Digital Board: Progressive Scan

1800	D15	2806	B3	2812	B3	2818	C7	2824	C14	2832	E12	3800	G4	3806	B8	3812	D14	3818	E14	3824	F14	5801	B12	5807	E12	7802	B14
2800	B14	2807	B3	2813	B3	2819	C8	2826	D11	2833	E12	3801	C14	3807	C14	3813	D13	3819	E14	3825	F14	5802	B12	5808	E12	7803-A	D14
2802	B2	2808	B2	2814	C11	2820	C9	2827	D12	2834	F14	3802	B8	3808	C14	3814	D13	3820	E10	3826	F11	5803	D12	5809	F12	7803-B	E14
2803	B2	2809	B3	2815	C12	2821	C14	2828	D12	2835	F10	3803	C13	3809	D10	3815	E10	3821	E13	3827	F11	5804	D12	5810	B8		
2804	B2	2810	B3	2816	C12	2822	C9	2829	D14	2836	G10	3804	C13	3810	D6	3816	D14	3822	E13	3828	G4	5805	D12	7800	B1		
2805	B2	2811	B3	2817	F12	2823	C9	2831	E11	2837	B8	3805	C8	3811	D11	3817	E11	3823	F11	5806	E12	5806	E12	7801	C6		



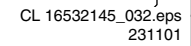
Digital Board: Power, Clock, and Reset Audio Clock

9 Power, Clock and Reset - AudioClock



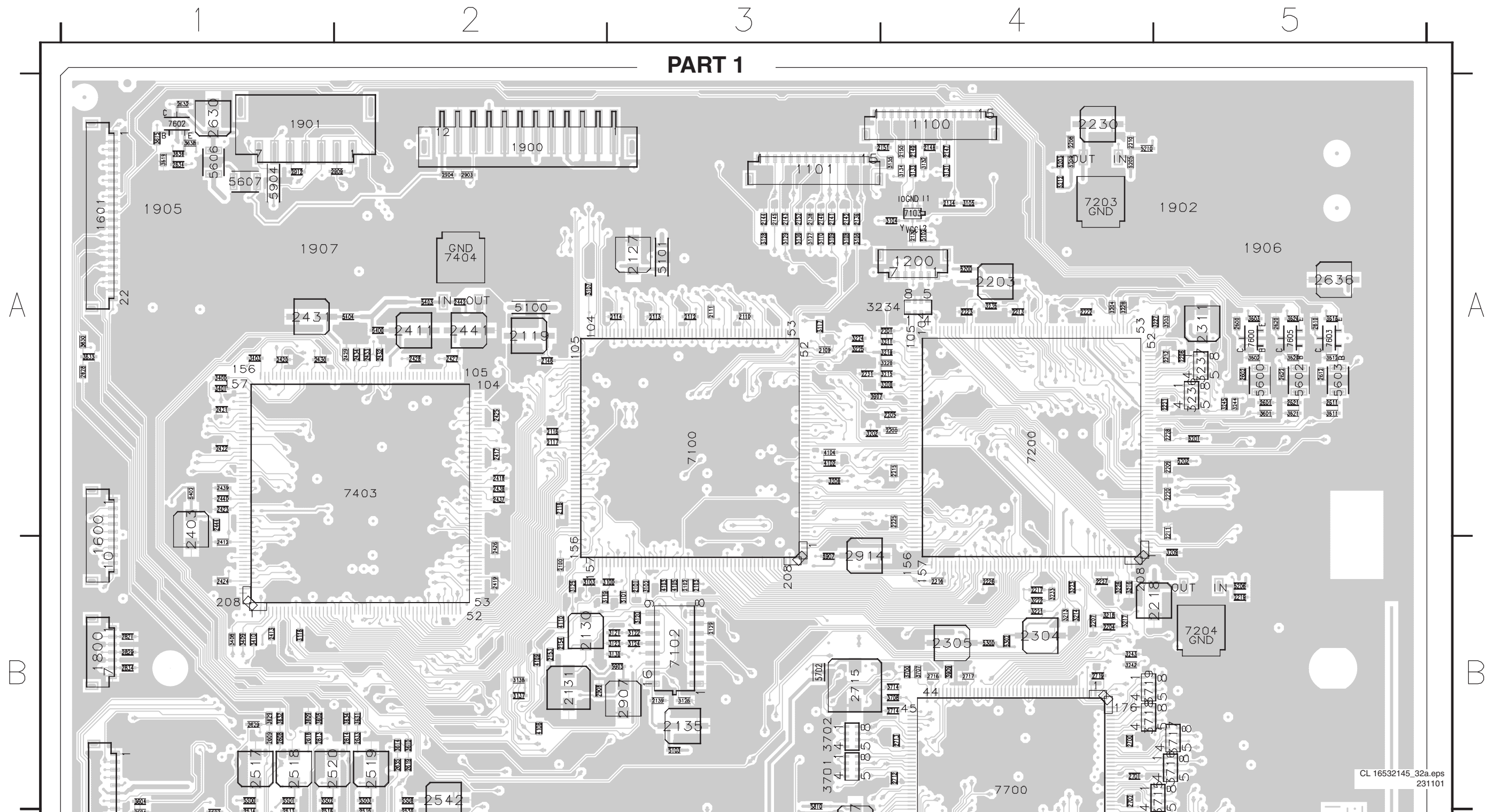
1900	A13
1901-1	G13
1901-2	F13
1901-3	G13
1901-4	H13
1901-5	F13
1901-6	H13
1901-7	F13
1902	I7
1903	I6
1904	I6
1905	I7
1906	I7
1907	I8
1908	I8
1909	A12
1910	A12
1911	A12
1912	B12
1913	B12
1914	A3
1915	A1
1916	A1
1917	G13
1918	H1
1919	H13
1920	F1
1921	F1
1922	B6
1923	A2
1924	B4
1925	B1
1926	B1
1927	G2
1928	E4
1929	E4
1930	F4
1931	F4
1932	G13
1933	G13
1934	C10
1935	D10
1936	G12
1937	H4
1938	H10
1939	H13
1940	H2
1941	H13
1942	I13
1943	I12
1944	A6
1945	B7
1946	A12
1947	B12
1948	A1
1949	F13
1950	H1
1951	F1
1952	B6
1953	C9
1954	D9
1955	A2
1956	B2
1957	B7
1958	D1
1959	F3
1960	D3
1961	H3
1962	C3
1963	E1
1964	G10
1965	H10
1966	G11
1967	H11
1968	G8
1969	G9
1970	H1
1971	F13
1972	G13
1973	G13
1974	H13
1975	H13

A horizontal number line with arrows at both ends. There are five major tick marks labeled 1, 2, 3, 4, and 5 from left to right. There are also four minor tick marks between each pair of major tick marks, dividing each unit into five equal parts.

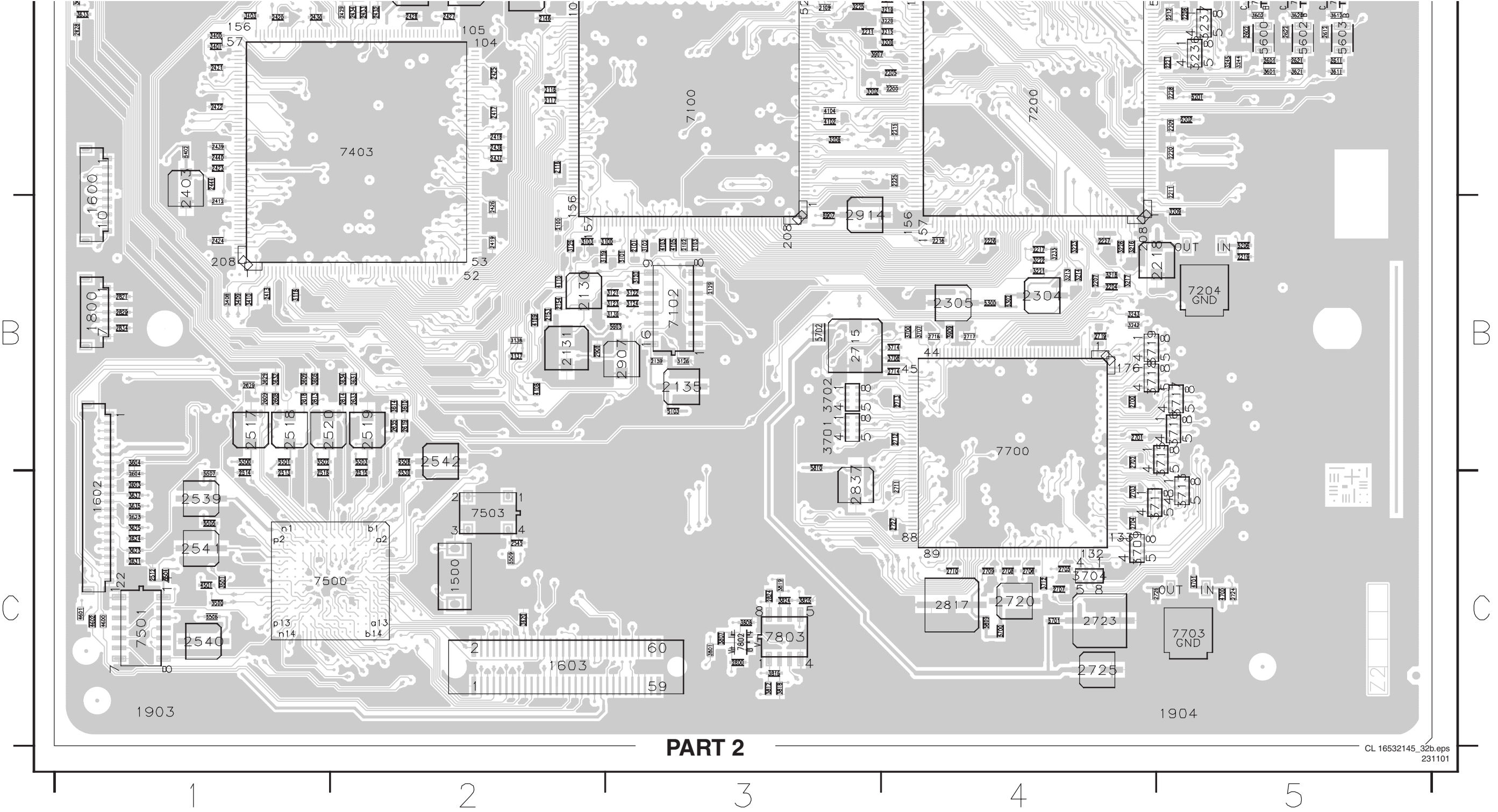


1100	A4	2311	A5	2707	C4	3221	B4	3909	B4
1101	A3	2403	A1	2708	C4	3222	B4	4102	A3
1200	A4	2411	A2	2709	C4	3223	B4	4103	B3
1500	C2	2412	B1	2710	C4	3224	A3	4104	A3
1600	A1	2413	B1	2711	C4	3225	A3	4105	B3
1601	A1	2417	A2	2712	B4	3226	B4	4108	B2
1602	C1	2418	A2	2713	B4	3227	A5	4109	B2
1603	C2	2419	B2	2714	B4	3228	A4	4110	B2
1800	B1	2420	A1	2715	B3	3233	B4	4501	C1
1900	A2	2421	A1	2716	B4	3234	A4	4600	C1
1901	A1	2422	A1	2717	B4	3235	A4	4601	C1
2100	B2	2423	A1	2719	B4	3236	A5	4602	C1
2101	B3	2424	B1	2720	C4	3237	A5	4700	C5
2102	B3	2425	A2	2723	C4	3242	B4	4701	C5
2103	B3	2426	B2	2724	C5	3243	B4	5100	A2
2109	A3	2427	A2	2725	C4	3244	A5	5101	A3
2110	A3	2428	A2	2726	C4	3245	A5	5102	A4
2111	A3	2429	A2	2727	C4	3400	A1	5103	B3
2112	A3	2430	A1	2800	C3	3401	A1	5200	A4
2113	A3	2431	A1	2817	C4	3403	A1	5201	A5
2114	A3	2432	A2	2821	B1	3408	B1	5202	A5
2116	A2	2433	A2	2824	C3	3409	B1	5203	A4
2117	A2	2434	A2	2829	B1	3410	B1	5205	A4
2118	A2	2437	A2	2834	B1	3500	C1	5206	B5
2119	A2	2438	A2	2837	C3	3501	C1	5209	A4
2127	A3	2439	A1	2903	A2	3601	A5	5210	A4
2129	B3	2440	A1	2904	A2	3602	A5	5212	A4
2130	B2	2441	A2	2907	B3	3603	A5	5300	B4
2131	B2	2442	A2	2908	B2	3604	B1	5302	B4
2132	A4	2444	A1	2909	A2	3605	B1	5400	A2
2134	A4	2512	C1	2912	A1	3609	B1	5402	A1
2135	B3	2513	C1	2914	B3	3610	B2	5403	A2
2136	A3	2514	C1	3100	B3	3611	A5	5404	A2
2138	A3	2515	C2	3101	B3	3612	A5	5500	B1
2139	B3	2516	C1	3102	B3	3613	A5	5501	B1
2140	A3	2517	B1	3103	B2	3614	B2	5502	B1
2141	A3	2518	B1	3104	A4	3615	A1	5503	B2
2142	A3	2519	B2	3105	A4	3619	A1	5504	C1
2143	A3	2520	B1	3106	A3	3620	C2	5505	C1
2144	A3	2530	C2	3107	A2	3621	A5	5506	C1
2145	A3	2539	C1	3108	A3	3622	A5	5507	C1
2146	A2	2540	C1	3109	A3	3623	C1	5508	B2
2147	A4	2541	C1	3110	A3	3624	A5	5509	C2
2148	A4	2542	B2	3117	A3	3625	C1	5600	A5
2149	A4	2545	C2	3118	B1	3629	B1	5602	A5
2150	A4	2600	A5	3119	B2	3630	A1	5603	A5
2151	A4	2601	A5	3120	B3	3631	B2	5606	A1
2152	A3	2602	A5	3121	B3	3632	B1	5607	A1
2153	B2	2603	C1	3122	B3	3633	A1	5700	C4
2154	B2	2604	C1	3123	B3	3634	B2	5701	C4
2200	A4	2608	B1	3124	B3	3635	C1	5702	B3
2201	A4	2609	B1	3125	B2	3636	A1	5809	C4
2203	A4	2610	A5	3126	B3	3637	C1	5810	B3
2204	B4	2611	A5	3127	A3	3638	A1	5903	B3
2205	A4	2612	A5	3128	A3	3700	B4	5904	A1
2206	A5	2613	B1	3129	A3	3701	B3	5907	B3
2207	B4	2614	B2	3130	B3	3702	B3	7100	A3
2208	A4	2618	B1	3131	A4	3704	C4	7102	B3
2209	A5	2619	B2	3132	A4	3707	B4	7103	A4
2210	A4	2620	A5	3133	A4	3708	B4	7200	A4
2211	A5	2621	A5	3134	A4	3709	C4	7203	A4
2212	A5	2622	A5	3135	A4	3711	C4	7204	B5
2213	A4	2623	C1	3136	A3	3712	C4	7403	A2
2215	A4	2624	C1	3137	B2	3713	C5	7404	A2
2216	B4	2628	A1	3138	B2	3714	B4	7500	C2
2217	B4	2629	B1	3200	A4	3715	B5	7501	C1
2218	B5	2630	A1	3202	A3	3716	B5	7503	C2
2219	B5	2631	C1	3203	A5	3717	B5	7600	A5
2220	A5	2632	A1	3204	A4	3718	B4	7602	A1
2221	A5	2633	B2	3208	A3	3719	B4	7603	A5
2222	A4	2634	A1	3209	B5	3801	C3	7605	A5
2223	A4	2635	B2	3211	A4	3807	C3	7700	B4
2225	A4	2636	A5	3213	B4	3808	C3	7703	C5
2226	B4	2700	B4	3214	B4	3812	C3	7802	C3
2227	B4	2701	B4	3215	A4	3816	C3	7803	C3
2228	A5	2702	B4	3216	B4	3818	C3		
2230	A4	2703	C4	3217	B4	3819	C3		
2231	A3	2704	C4	3218	B4	3824	C3		
2304	B4	2705	C4	3219	A4	3825	C3		
2305	B4	2706	C4	3220	A4	3907	A3		

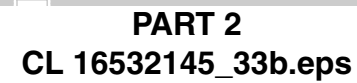
Layout Digital Board (Part 1 Top View)



Layout Digital Board (Part 2 Top View)

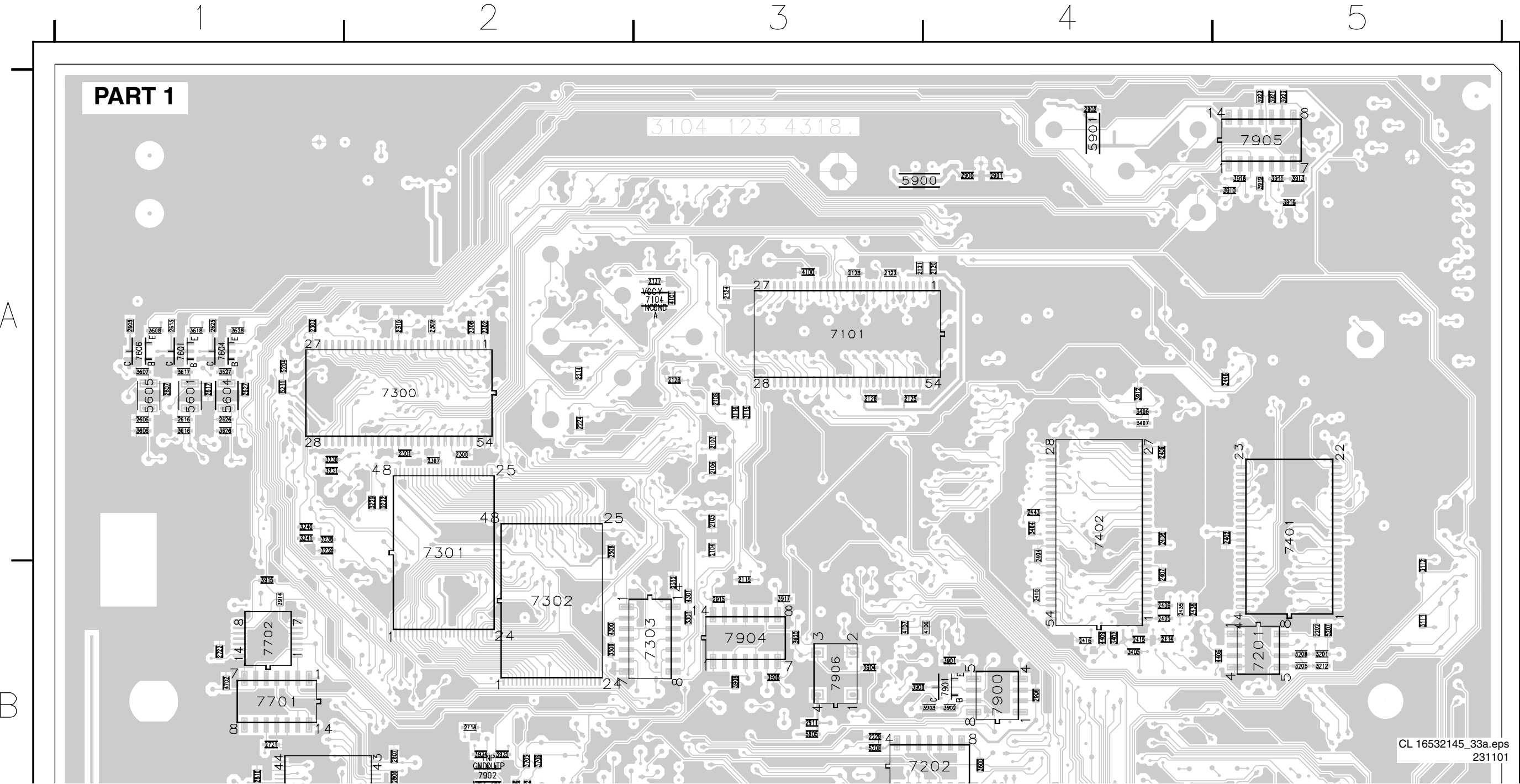


PART 1
CL 16532145_33a.eps

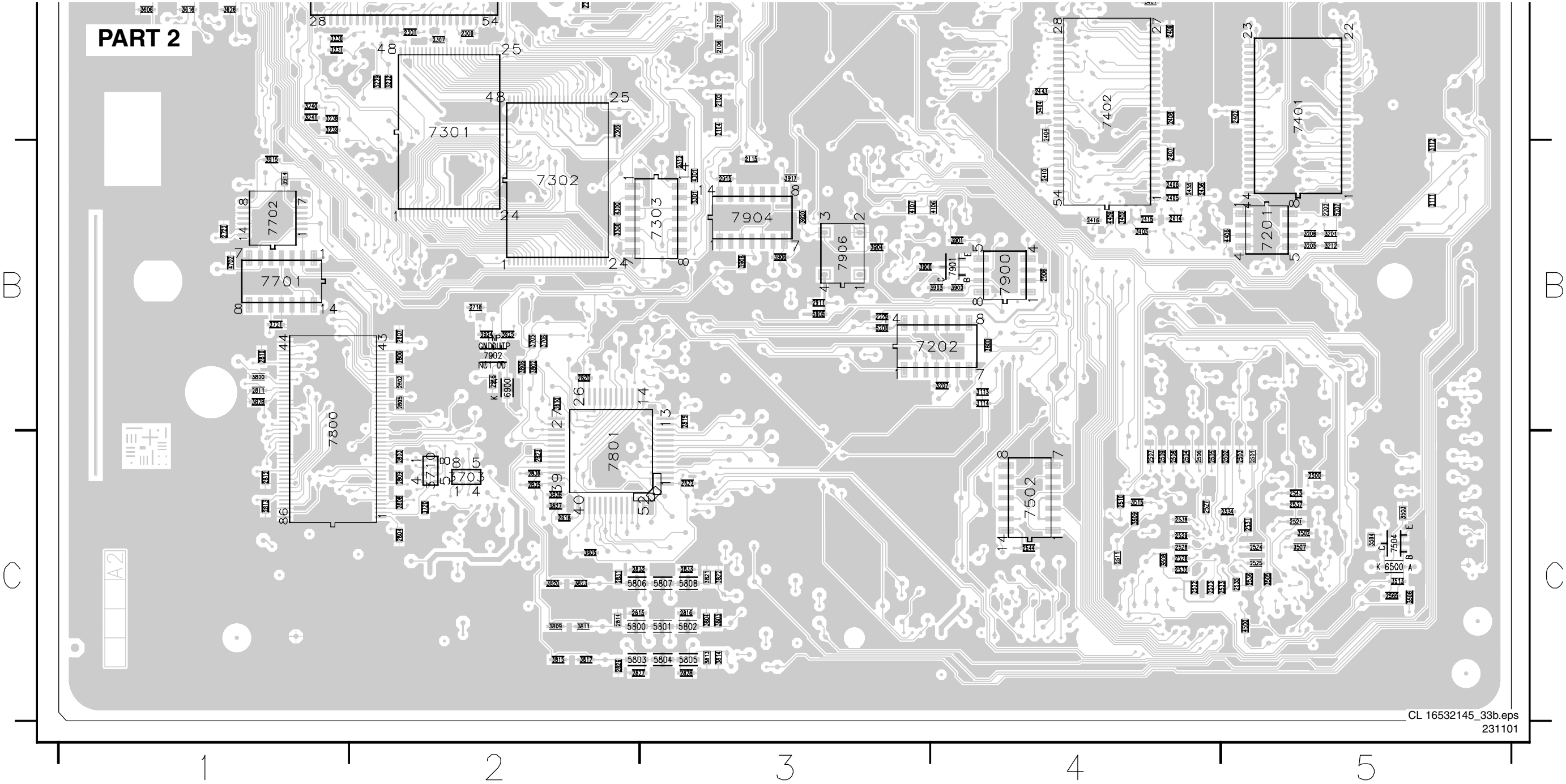


A	2104	A3	2802	B2	3803	C3	7702	B1
	2105	A3	2803	C2	3804	C3	7800	B1
	2106	A3	2804	C2	3805	C2	7801	C2
	2107	A3	2805	B2	3806	B2	7900	B4
	2108	A3	2806	B2	3809	C2	7901	B4
	2115	B3	2807	B2	3810	B2	7902	B2
	2120	A4	2808	C2	3811	C2	7904	B3
	2121	A3	2809	C2	3813	C3	7905	A5
	2122	A3	2810	B1	3814	C3		B3
	2123	A3	2811	B1	3815	C2		
B	2124	A3	2812	C1	3817	C2		
	2125	A3	2813	C1	3820	C2		
	2126	A3	2814	C2	3821	C3		
	2128	A3	2815	C2	3822	C3		
	2137	A3	2816	C3	3823	C2		
	2202	B5	2818	C2	3826	C2		
	2214	A2	2819	B3	3827	C2		
	2224	A2	2820	B2	3828	B1		
	2229	B3	2822	C3	3900	B3		
	2300	A2	2823	C2	3901	B4		
	2301	A2	2826	C2	3902	B4		
	2302	A2	2827	C2	3903	B4		
	2303	A1	2828	C3	3904	B3		
	2306	A2	2831	C2	3906	B3		
	2307	A2	2832	C2	3908	B3		
	2308	A2	2833	C3	3910	A5		
	2309	A2	2835	C2	3911	A5		
	2310	A2	2836	C2	3912	A4		
	2312	B3	2900	A4	3913	A5		
	C	2402	A5	2901	A4	3914	B1	
2404		A4	2902	A4	3915	B1		
2405		B4	2906	B4	3916	A5		
2406		B4	2911	B3	3917	B3		
2407		B4	2915	B3	3918	A5		
2408		A4	2916	B2	3919	A5		
2409		A4	3111	B5	3920	B3		
2410		B4	3112	B5	3921	A5		
2414		B4	3113	B4	3922	A5		
2415		B4	3114	B4	3923	A5		
2416		B4	3115	A3	3924	B2		
2435		B4	3116	A3	3925	B2		
2436		B4	3201	B5	4100	A3		
2443		A4	3205	B5	4101	A3		
2446		A5	3206	B5	4106	B4		
2500		C5	3207	B4	4107	B3		
2501		C5	3212	B5	4300	B2		
2502		C5	3229	A2	4301	B3		
2503		C5	3230	A1	4406	B5		
2504		C4	3231	A1	4409	B4		
2505	C4	3232	A2	4500	C5			
2506	C4	3238	A1	4702	B1			
2507	C4	3239	A1	5204	A1			
2508	C4	3240	A1	5207	B5			
2509	C4	3241	A1	5208	B3			
2510	C4	3300	B2	5211	A1			
2511	C4	3301	B3	5601	A1			
2521	C5	3402	B4	5604	A1			
2522	C4	3404	A4	5605	A1			
2523	C4	3405	B4	5800	C2			
2524	C5	3406	A4	5801	C3			
2525	C5	3407	A4	5802	C3			
2526	C4	3502	C5	5803	C2			
2527	C4	3503	C5	5804	C3			
2528	C4	3504	C5	5805	C3			
2529	C4	3505	C5	5806	C2			
2531	C5	3506	C5	5807	C3			
2532	C4	3507	C5	5808	C3			
2533	C5	3508	C4	5900	A3			
2534	C5	3509	C4	5901	A4			
2535	C5	3513	C5	5905	B3			
2536	C5	3515	C4	6500	C5			
2537	C5	3600	B4	6900	B2			
2538	C4	3606	A1	7101	A3			
2543	C5	3607	A1	7104	A3			
2544	C4	3608	A1	7201	B5			
2565	C5	3616	A1	7202	B4			
2605	A1	3617	A1	7300	A2			
2606	A1	3618	A1	7301	A2			
2607	A1	3626	A1	7302	B2			
2615	A1	3627	A1	7303	B3			
2616	A1	3628	A1	7401	A5			
2617	A1	3703	C2	7402	A4			
2625	A1	3705	B2	7502	C4			
2626	A1	3706	B2	7504	C5			
2627	A1	3710	C2	7601	A1			
2718	B2	3720	C2	7604	A1			
2721	B1	3800	B1	7606	A1			
2722	B1	3802	B2	7701	B1			

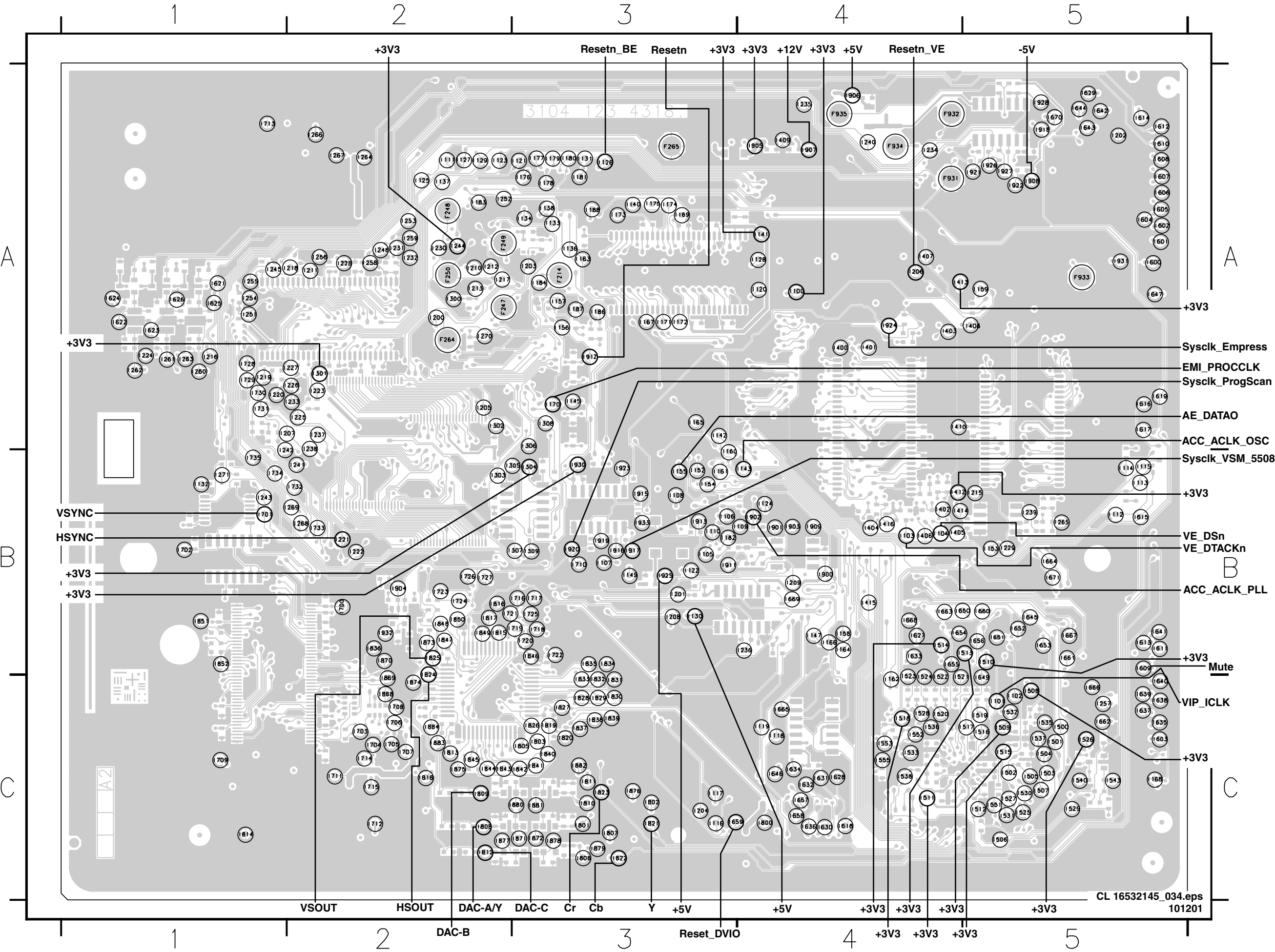
Layout Digital Board (Part 1 Bottom View)



Layout Digital Board (Part 2 Bottom View)



Layout Digital Board (Testlands Bottom View)



This image shows a full page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, providing a template for handwriting practice or general writing. There are no margins, text, or other markings on the page.

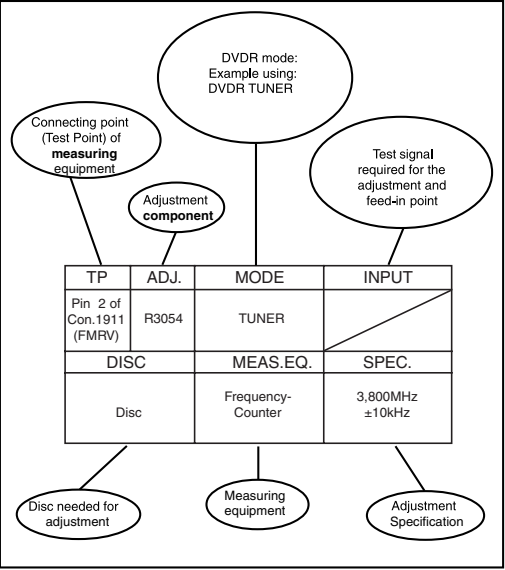
8. Alignments

8.1 Alignment Instructions Analogue Board

Test equipment:

1. Dual-trace oscilloscope
Voltage range : 0.001 ~ 50 V/div
Frequency : DC ~ 50 MHz
Probe : 10:1, 1:1
2. DVM (Digital voltmeter)
3. Frequency counter
4. Sinus generator
Sinus : 0 ~ 50 MHz
5. Test pattern generator

How to read the adjustment procedures:



Front End (FV)

Service tasks after replacement of IC 7710, coil L5710 and L5711:

1 AFC Adjustment:

Purpose: Correct adjustment of demodulator AFC - circuit

Symptom, if incorrectly set:
Bad or disturbed TV channel reception.

PAL - AFC adjustment [5711]:

TP	ADJ.	MODE	INPUT
IC 7710 Pin 17 (F708)	L5711	TUNER	38,9MHz 500mV _{pp} at Tuner 1705, Pin 11 (F710, IF-out)
DISC		MEAS.EQ.	SPEC.
		DC Voltmeter Frequ. Generator	2,5V ±0,1V

Storage in NVRAM via command mode interface of DSW:
After adjustment, the AFC reference value has to be stored in the NVRAM.
This reference value is 256 * measured voltage/Ucc. Ucc is 5.0V.
Store the reference value via command 732 , followed by the ref. value.
Example: DD:> 732 128

2 HF - AGC adjustment [3724]:

Service tasks after replacement of IC 7710:

Purpose: Set amplifier control.

Symptom, if incorrectly set:
Picture jitter if input level is too low and picture distortion
if input level is too high.

TP	ADJ.	MODE	INPUT
Tuner 1705 Pin 11 (F710, IF-out)	R3707	Set tuned to channel 25 503.25 MHz	5mV(74dBμV) on aerial input PAL white picture, audio IF on, no modulation
DISC		MEAS.EQ.	SPEC.
		Oscilloscope Video Pattern Generator	500mV _{pp} +/-0.5dB (use a 10:1 probe)

**3 Attenuating the 40.4 MHz [5710]:
(SECAM only)**

Service tasks after replacement of coil 5710:

Purpose: To attenuate the band I carrier rests.

Symptom, if incorrectly set:
Bad picture quality when the filter attenuates the picture
carrier (38.9MHz).

TP	ADJ.	MODE	INPUT
OFW 1701 Pin 1 (F709)	L5710	TUNER	40.4 MHz, 200mV _{rms} at Tuner 1705, Pin 11 (F710, IF-out)
DISC		MEAS.EQ.	SPEC.
		Oscilloscope, Sinus Generator, Counter	adjust minimum amplitude

If the adjustment is correct the signal at pin 1 of OFW [1701] must be
smaller than the input signal amplitude by at least 6 dB.

Figure 8-1

8.2

Reprogramming Procedure of NVM on the Microprocessor Sub PCB

The NVM, item 7808, on the Microprocessor Sub board contains the following factory settings:

1. Clock correction factor
2. AFC reference value
3. Slash version

The settings 1,2 and 3 are stored in the NVM during the production of the analogue board.
The slash version is stored at the end of the production line of the set.
In case of failure, the NVM must be replaced by an empty device. By way of commands via the Diagnostic Software or via ComPair, the factory settings must be restored in the NVM.

8.2.1

Clock Correction Adjustment

To guarantee an exact function of the real time clock, an adjustment of the clock frequency is possible. The adjustment value is stored in the NVM.
Procedure:

- put the set in service command mode
- execute command 722 to initiate that a signal with 32768 Hz is available on pin 3 of connector 1988
DD:>722
- measure the frequency f_{meas} of the Clock Crystal with an accuracy of ± 0.1 Hz.
- Calculate the parameter to be entered: $32768/f_{\text{meas}} * 10^6$
- Normally the parameter must be between 999902 and 1000097. If the parameter and therefore the frequency of the crystal is outside this range, the crystal must be replaced.
- Execute command 721 with the parameter as input
example:
DD:>721 1000023

8.2.2

AFC Reference Voltage Tuner

This function stores the reference voltage for the tuner in the NVM. Before this value can be stored, the AFC adjustment, described in the adjustment instructions of the analogue board, must be carried out.
Procedure:

- Adjust AFC circuit
- Calculate the reference value
- Execute command 732 and use the calculated reference value as parameter
example:
DD:>732 128

8.2.3

Slash Version

The slash version is stored with command 715 followed by the slash version as parameter.
The slash versions used in DVDR880 and DVDR890 are the following:

- DVDR880/00X: 63
- DVDR880/02X: 63
- DVDR880/05X: 64
- DVDR890/00X: 61
- DVDR890/02X: 61
- DVDR890/05X: 62
- DVDR890/69X: 81
- DVDR890/17X: 61

Example:
DD:>715 63

Reset of Slash Version
Use command 729 to reset the analogue board to the default setting.
Procedure:

- Put the set in DSW command mode
- Execute command 729 with the following parameters:
DD:> 729 w 0xA0 3 0x07 0xD0 0x00
- Leave the DSW command mode and start up the set in application mode
No background is visible on the TV screen. The analogue board is ready to accept the appropriate slash version

8.3

Rework Procedure IEEE Unique Number

8.3.1

Scope:

The procedure describes how to upgrade sets with a unique number after repair. This unique number is stored in the NVRAM (item 7201) of the digital board at the end of the production line.
This procedure is only valid or necessary when:

- The digital board is replaced
- NVRAM on the digital board is replaced
- NVRAM is cleared

In all other cases the repaired set retains its unique number.
The procedure defines several means to re-assure the unique number depending on the possibilities of repair or the state the faulty set is in.

8.3.2

Handling:

State of original (defective) board:

1. The digital board starts up in Diagnostics Mode: follow procedure A to retrieve the valid unique number
2. The digital board does NOT start up in Diagnostics Mode: follow procedure B.

8.3.3

Procedure A

1. Connect defective digital board to PC via serial cable (3122 785 90017)
2. start up hyper terminal or any other serial terminal via the correct settings (DSW command mode interface)
3. read out existing unique number via nucleus 403
example:
DD:> 403
40300: DV Unique ID = 00D7A1FC6C
Test OK @
4. note read out
5. program new digital board via nucleus 410
example: DD:> 410 00D7A1FC6C
41000:
Test OK @

The set has now the original unique number

8.3.4 Procedure B

1. Note the serial number of the set
example:
VN050136130156
 - VN = production centre (VN....Szekesfehervar).
According to UAW-500: V=22 and N=14
 - 05 = change code (this is not used for this calculation)
 - 01 = YEAR
 - 36 = Production WEEK
 - 130156 = Lot and SERIAL number
2. Calculate the unique number: this number always exists out of 10 hexadecimal numbers.
3. First 5 numbers:
First we calculate a decimal number according to the formula below:
35828*YEAR + 676* WEEK + 26*V + N + 8788
The figures are fixed, YEAR + WEEK + factory code (V + N) are variable
Example:
35828*01+676*36+26*22+14+8788 = 69538 (decimal)
Then we translate the decimal number to a hexadecimal number.
example:
69538 (decimal) = 10FA2 (hex)
4. Last 5 numbers:
The last 5 numbers exist out of the Lot and SERIAL number.
We have to translate the decimal number to the next 5 hexadecimal numbers:
Example:
130156 (decimal) = 1FC6C (hex)
5. Program new digital board via nucleus 410
Therefore we use the 10 hexadecimal numbers we calculated above:
example:
DD:> 410 10D7A1FC6C
41000:
Test OK @

The set has now its original unique number

9. Circuit-, IC Descriptions and List of Abbreviations

9.1 Display Board

9.1.1 Microcontroller

The core element of the Display Control unit is the microcontroller TMP87CH74AF [7110]. The TMP87CH74AF is an 8 bit microcontroller fitted with 32kB ROM and 1kB RAM. It requires 5V supply and is responsible for the following functions:

- Interface to Central Controller-µP
- Evaluation of the keyboard matrix
- Decoding the remote control commands from the infra-red receiver
- Activation and control of the local display
- Heater voltage generation

The 8 MHz resonator (Pos. 1111) generates the system clock. The reset is generated by the CC-µP via “POR_DC”-signal where the transistor [7106] is used as a level-shifter from 3V3 to 5V.

9.1.2 Interface to the Central Control µP

The communication to the main microcontroller (CC) on the µP-Sub-PCB is done via I²C-Interface, where the TMP87CH74AF acts in slave-mode. An additional wire (“INT”-line) is used to signal the Central controller that data are ready, e.g. when a key has been pressed.

9.1.3 Evaluation of the Keyboard Matrix

There are 10 different keys on the display board. A resistor network is used to generate a specific direct voltage value, depending on the pressed key. Via the resistors 3168 and 3169 on the analog/digital (A/D) ports (7110 pin 37 and 38) the evaluation is done.

9.1.4 IR Receiver and Signal Evaluation

The IR receiver [7150] contains a selectively controlled amplifier as well as a photo-diode. The photo-diode changes the received infra red transmission (approx. 940nm) to electrical pulses, which are then amplified and demodulated. On the output of the IR receiver [7150], a pulse sequence with TTL-level, which corresponds to the envelope curve of the received IR remote control command, can be measured. This pulse sequence is fed into the controller for further processing via port TC1 [7110, pin20].

9.1.5 Vacuum Fluorescence Display

The VFD “10-BT-242GNK” [POS 7100] is fully controlled by the microcontroller. The µC also includes the driving stages. Only two additional drivers [POS 7101 and 7102] are necessary for the grids 8 and 10 because of their large size.

9.1.6 VFD Heater Voltage Generator

The circuit around POS [7103, 7104 and 7105] is used to generate a proper AC-Voltage for the filament of the VFD. For this the microcontroller generates an appropriate rectangular signal with 50% duty-cycle and a frequency of 30 kHz at pin 19. Pos. [5193] and [2102] are acting as a resonance-circuit. Via Zener-Diode (POS[6100]) and resistors [3100, 3103 and 3104] the two heater-pins of the VFD (“FIL1” and “FIL2”) are clamped so that the grids and segments can be fully switched off.

9.1.7 REC-LED

The REC-LED is a red LED, located on a small PCB together with the REC-Switch and controlled via pin 3 of the microcontroller. The POS [7180] is used as a driver for the led.

9.2 Microcontroller Sub Board (UPC12 SUB PCB)

9.2.1 General

This small PCB is directly soldered in on top of the Analogue-Board. It is used with no diversity in all three different basic versions (Europe, NAFTA and APAC-Pal). Only the software being loaded into the external Flash-memory is not the same.

9.2.2 Microcontroller

The main part of the Sub-PCB is the central controller (CC) µP [7804] TMP91CW12AF, which is a 16-bit CPU with 128kBROM and 4kB RAM.

It works with a 3V3 supply and a system clock of 24,576MHz [1801].

The 3V3-supply is made out of the “5VSTBY” by the circuit around [7816].

After connecting the set to the mains (power-up) the IC [7806] generates a reset pulse. This signal (“IPOR”) is directly fed to first priority interrupt input (pin 63) for power fail detection and also to the Reset-Input of the CC (Pin30) via [7802], which is necessary to generate a reset only during power-up. In case of power fail pin 30 of the CC must be kept high (3V3).

The internal memory of the CC is too small for all necessary demands. Therefore an external Flash-ROM [7805] with 1MByte in size and a RAM [7803] with 128kByte are necessary. Both parts are connected to the µP via a parallel address-/data-bus. The lower eight bus-lines (AD0 to AD7) are multiplexed by [7801] and the “ALE”-signal of the CC. For updating of the software the external Flash-ROM can be reprogrammed by the µP. During this process [7807] is switched on by the “WE”-signal.

When no mains is connected, the CC is supplied via Gold-Cap [2816] during the power backup period. The diode [6802] prevents unwanted current consumption of other components. The internal ROM of the µP holds the program code for the Real-Time-Clock. Only the microprocessor is supplied by the backup cell, not the external memories and the µP operates in a low frequency mode with the clock crystal [1805] only (32.768 kHz). To adjust the clock the frequency can be measured at pin 87 of the µP in a special test-mode.

9.2.3 Control-Interfaces

The CC is communicating with the digital board via a serial connection, which operates at a speed of 19,4 kbit/s (“D_DATA”-, “A_DATA”, “D_RDY”- and “A_RDY”-signal on [1986]). By generating a high level on pin 16 of the CC the digital PCB can be reset (inverter [7817] in between).

Most of the other parts are controlled by the µP via I²C-bus (“SDA”- and “SCL”-signal). The FETs [7821] and [7822] are used for adaptation of the 3V3-level on CC-side to the components supplied with 5V.

The CC can also reset the display-board-µP by pulling pin 39 to high.

The transistor [7819] acts as a level shifter for the “INT”-signal. In the European sets a bi-directional interface is established between the recording unit and the TV device at pin 10 of the Scart (“P50”-line/Easy Link). The processing is done via pin 14 (output) and pin 38 (input) of the CC and the circuit around [7813], [7814] and [7815].

9.2.4 EEPROM

The EEPROM M24C16 [7808] is an electrical erasable and programmable, non-volatile memory. The EEPROM stores data specific to the device, such as the AFC-reference value of the Europe IF-part, the clock-correction-factor, etc. It is accessed by the μ P via the I²C-bus.

9.2.5 Sync Separator

To detect whether a video signal is available or not a separate IC [7825] is used to extract the sync information out of the video signal that is also routed to the digital board for recording. While on the input a low-pass-filter ([2823] and [3869]) limits the bandwidth an additional filter (circuit around [7818]) on the output avoids distortions. Afterwards the sync-signal is routed to pin11 of the CC.

9.2.6 Fan Control

To avoid unwanted temperatures inside the set (especially the Laser on the OPU of the drive is very sensitive) a fan is located on top of the basic engine. The speed control is dependent on the ambient temp. A NTC resistor [3172] located on the display board measures the temperature. An operational amplifier [7902-B] generates a proper voltage, which is then fed to the engine ("BE_FAN"-line). Below 28°C ambient temp. the fan-voltage is approx. 5V and is increased to 10V when the ambient temperature goes up to approx. 35°C. The second part of the Op-Amp. [7902-A] prevents damage of any temperature-sensitive part in case the NTC or the wire in between is damaged. It acts as a comparator and pulls the "BE_FAN"-signal to 10V. As the fan has to be stopped in case the tray of the drive is open this voltage is "killed" by the CC ("FAN_OFF"-signal). The double-diode [6903] acts for both Op.-Amp.-circuits.

9.2.7 Power Supply

The 5SW and 8SW supply are switched off in case of standby from the P via the ISTBY-line. This is possible for power-save. The ISTBY-line must be low in case of STBY. There is also a „power fail“ circuit on the PS-schematic which is necessary to mute AUDIO when IPFAIL is low.

9.3 Analog Board Europe

9.3.1 General

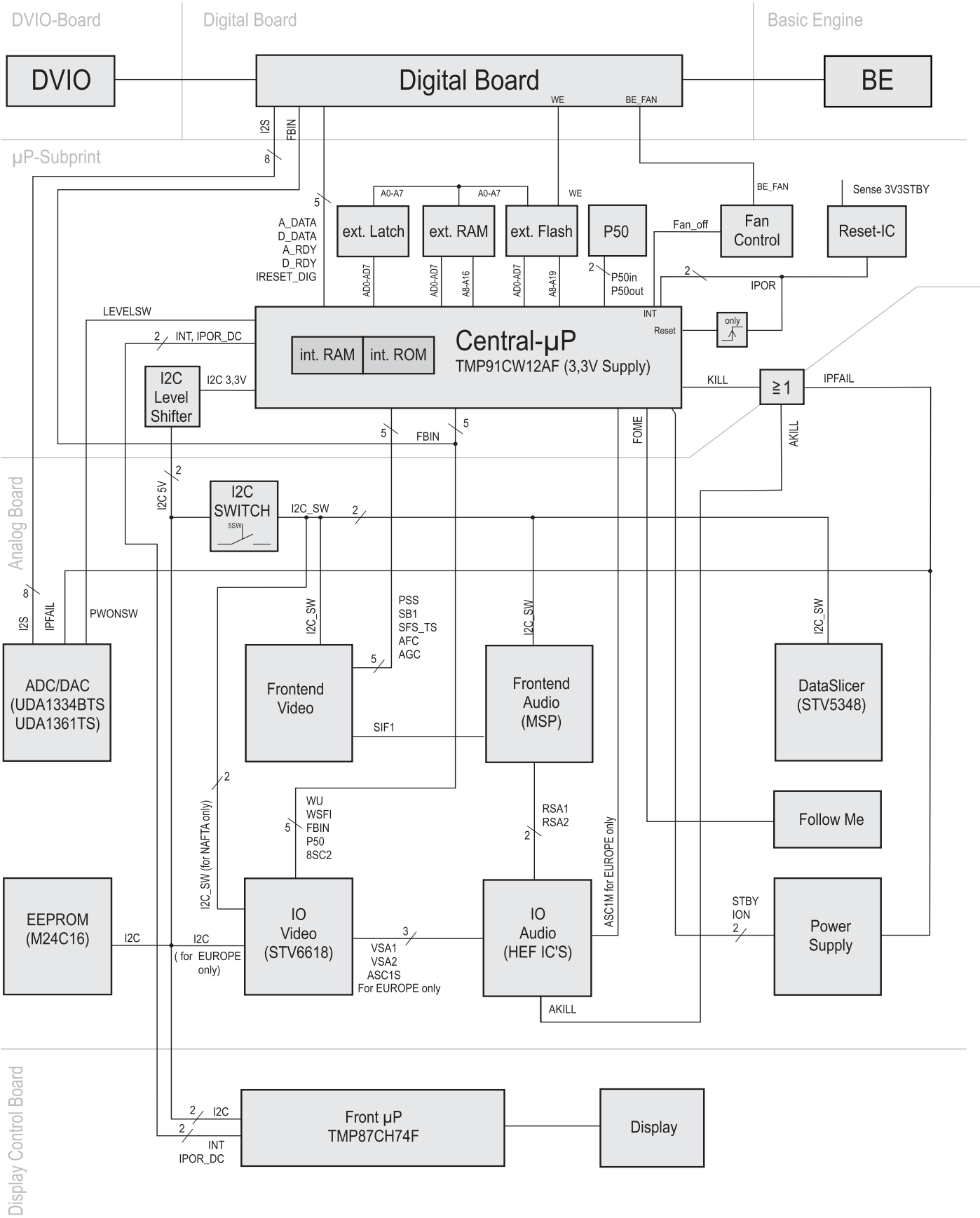
This PCB consists out of the following parts:

- Power-Supply-Unit
- Frontend (Audio & Video)
- Input/Output-switching
- Audio ADC- & DAC-processing
- VPS/PDC- and Text-Data slicer
- Analog Follow-Me Circuit

All functional groups are either controlled via I²C-bus or via separate signal lines by the Central-Controller on the μ P-Sub-Board. This sub board is directly soldered in onto the analog PCB. During Stand-By mode of the set, several parts are not supplied (Tuner, MSP, ...). The microprocessor is running and maintains the clock of the set.

To avoid bus blockades the I²C-bus ("SCLSW" & "SDASW") to/from these units is decoupled via transistors [7419], [7420] from the general bus ("SCL" & "SDA").

Blockdiagram Control Lines and Bus Systems



9.3.2 Power Supply Unit

Functional Principle:

This power supply works in the way of a flyback converter. In the mains input part [1931 to 2309], the mains voltage is rectified and buffered in the capacitor [2309]. From this direct voltage at [2309] energy is transferred into the transformer [5300, pins 7-5] during the conductive phase of the switching transistor [7307] and is stored there as magnetic energy. This energy is passed to the secondary outputs of the power supply in the blocking phase of the switching transistor [7307]. With the switch-on time of the switching transistor [7307], the energy transferred in every cycle is regulated in such a way that the output voltages remain constant regardless of changes in the load or mains voltage. The power transistor is driven by the integrated circuit [7313].

Mains input part:

The mains input part extends from the mains socket [1931] to the capacitor [2309]. The diodes [6301, 6302, 6305 and 6306] rectify the AC supply voltage, which is then buffered by the capacitor [2309]. The common mode coil [5302] and capacitor [2302] work as a filter to block interference arising in the power supply from the mains. Components [1302], [3306] protect the power supply against short-term over voltages in the mains, e.g. caused by indirect lightning.

Start-up with Mains-on:

After connecting the power cord to the mains, the capacitor [2325] is loaded via a current source between pin 8 and pin 1 in the IC [7313]. Once the voltage on [2325] and therefore the supply voltage V_{cc} of the IC [7313] has reached approx. 11V, the IC starts up and provides pulses at its output pin 5. These pulses are used to drive the gate of the power transistor [7307]. The frequency of these pulses is depending on load and mains voltage. The current consumption of the IC is approx. 5 mA at V_{cc} in normal mode.

If V_{cc} drops to below approx. 9V (e.g. with power limitation) or if V_{cc} exceeds approximately 16V (e.g. interruption of the control loop), the output of the IC [7313, pin 5] is blocked and a new start-up cycle begins. (See also "Overload, Power Limitation, Burst Mode" section)

Normal operation:

With increasing load on one or more of the power supply outputs, the switch-on time for the power transistor [7307] increases, and thus also the peak value of the delta-shaped current through this power transistor. The equivalent voltage of this current profile is passed from resistors [3321] and [3352] via [3365] to pin 5 of the IC [7313]. If the voltage on pin 2 reaches approx. 0.4V in one switching cycle, the conductive phase of the switching transistor is ended immediately. The check is done in each individual switching cycle. This process ensures that no more than approx. 50W can be taken out from the mains (= **power limitation**).

If the power supply reaches the power limit, the output voltages and the supply voltage V_{cc} on pin 1 of the IC [7313] will be reduced following further loading. If V_{cc} is less than approx. 9V at any point during this process, the output of the IC [7313, pin 6] is blocked. All output voltages and V_{cc} decrease and a new start-up cycle begins. If the overload status or short-circuit remains, the power limitation will be activated immediately and the voltages will again decrease, followed by another start-up cycle (**Burst Mode**). The amount of power taken up from the mains in burst mode is low.

Overload, power limitation, burst mode

With the power supply in normal mode, the periodic sequences in the circuit are divided primarily into the conductive and blocking phase of the switching transistor [7307]. During the **conductive phase** of the switching transistor [7307], current flows from the rectified mains voltage at capacitor [2309] through the primary coil of the transformer [5300, pins 7-5], the transistor [7307] and resistors [3321, 3352] to ground.

The positive voltage on pin 7 of the transformer [5300] can be assumed as constant for a switching cycle. The current in the primary coil of the transformer [5300] increases linearly. A magnetic field representing a certain value of the primary current is formed inside the transformer. In this phase, the voltages on the secondary coils are polarized such that the diodes [6300, 6303, 6307, 6308, 6310, 6313, 6317 and 6319] block. From the controller [7315] a current is supplied into the CTRL input on the IC [pin 3, 7313] via optocoupler [7314]. Once the switch on time of the switching transistor [7307] - that corresponds to the current supplied into the CTRL input - has been reached, the switching transistor [7307] is switched off.

When the switching transistor has been switched off, the **blocking phase** begins. No more energy will be transferred into the transformer. The inductivity of the transformer will still attempt to keep the current flowing at a constant level ($U=L \cdot di/dt$). Switching off transistor [7307] interrupts the primary current circuit. The polarity of the voltages on the transformer is reversed, which means that the diodes [6300, 6303, 6307, 6308, 6310, 6313, 6317 and 6319] become conductive and current flows into the capacitors [2305, 2312, 2319, 2322, 2326 and 2328] and the load. This current is also ramp-shaped (di/dt negative, therefore decreasing).

The **feedback control** for the switched-mode power supply is done by changing the conductive phase of the switching transistor so that either more or less energy is transferred from the rectified mains voltage at [2309] into the transformer. The regulation information is provided by voltage reference [7315].

This element compares the 5V-output voltage via voltage divider [3332, 3333, 3334] with an internal 2.5V reference voltage. The output voltage of [7315] passes via an optocoupler [7314] for insulation of primary and secondary parts as a current value into pin 3 on the IC [7313]. The switch-on time of the transistor [7307] is inversely proportional to the value of this current.

Standby modes:

In the 'AV-Standby' operating mode of the set, the 'ION' control line is primarily used to switch off all output voltages for Basic Engine and Digital Board (supplies 3V3, 5V, 12V, 5N and 4V6 at Connectors 1932 and 1933) of the power supply. This reduces the amount of power taken from the mains. In Low Power Standby mode additionally the 'STBY' control line is used to switch off output voltages 5SW and 8SW. This reduces power consumption to less than 3W. The power supply will continue operating in Standby mode with a switching frequency of approx. 25 kHz.

9.3.3 Frontend

This unit is designed to support two basic versions, which are distinguished by a different assembly variant only (one for multistandard and the second for Pal-I only) and comprises the following parts:

- Tuner UV1316K [1705]
- IF amplifier & video demodulator IC TDA 9818/9817 [7710]
- Sound processor MSP3415G [7600]

Tuner and IF selection

The Tuner [1705] converts the RF-signal coming from the antenna input to an IF-signal. The tuner is fully controlled via I²C-bus of the CC-μP. [1705] is also equipped with a "passive-loop-through" between antenna-in and -out to save power in stand-by of the set, when the complete part is not supplied. The IF frequency of the video carrier is 38.9 MHz for all systems except SECAM L' (34,0 MHz).

A quasi-split audio system is used. Separate surface-wave filters (SAW) are required. [1701], [1703] for video, [1702] for audio. [1701] is switched into the signal path for DK/I-SECAM L/L' reception, if the signal "SFS_TS" is "high". In this case the switches [7704], [7705] are open and the diode [6703] is conducting. [1703] is switched into the signal path for BG reception ("SFS_TS" is "low"). Then the switch [7712] is open and the diode [6704] is conducting. For DK/I-SECAM L/L' recep-

tion, an additional circuit for suppressing the audio carrier of the adjacent channel is used. This circuitry is adjusted by coil [5710] for maximum suppression at 40.4MHz.

IF demodulator

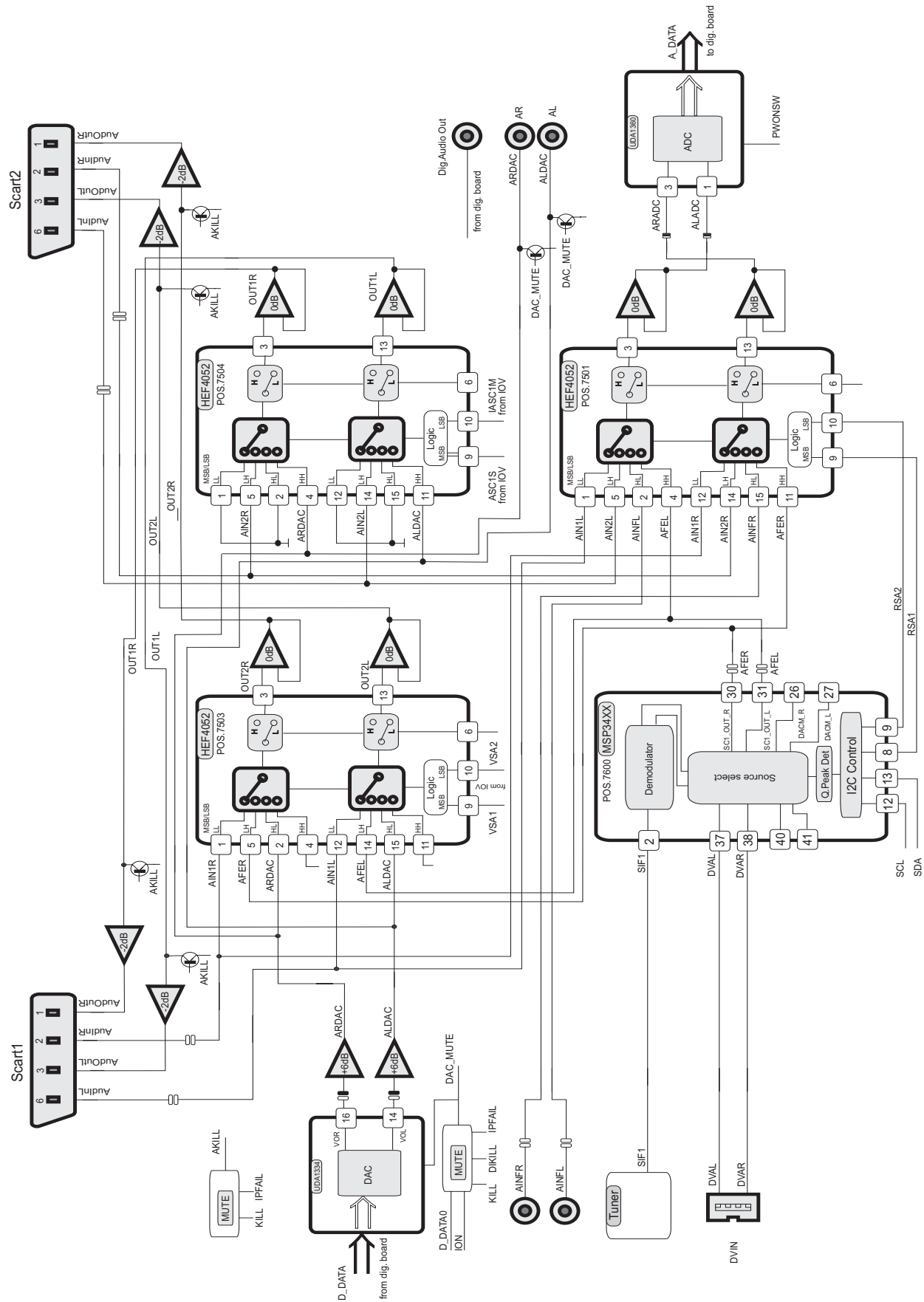
The signal from the tuner and IF-selection circuit is processed by the demodulator IC TDA 9818/9817 [7710]. The signal "PSS" to pin 3 switches between demodulation of positive (SECAM only) or negative modulated video carriers. A QSS-audio-IF signal SIF1 is generated for demodulation in the sound processor [7600]. The audio-IF carrier is selected in the audio SAW filter [1702]. This filter is switched for SECAM L'. If the signal "SB1" is "high", the switch [7714] is closed and the diode [6705] is not conducting. For all other standards the diode [6705] is conducting and the switch [7714] is open. The output signal of this SAW filter is firstly processed in the TDA 9818. Audio carriers are converted from the tuner IF level to the audio IF position and further processed in the audio demodulator [7600]. The AFC coil [5711] on the TDA 9818/9817 is adjusted so that when a frequency of 38.90 MHz is supplied to the IF output of the tuner, the AFC voltage on pin 17 of [7710] is 2.5V. The setting of the picture carrier frequency for SECAM L in the TDA 9818 is achieved by connecting pin 7 of the IC via a resistor [3710] to ground. The switch [7701] and the signal "SB1" do this. The HF-AGC is set using the potentiometer [3724] so that, with a sufficiently large antenna input signal (74 dB_{μV}), the voltage at the IF output of the tuner [1705] pin 11 is 500 mV_{pp}. This setting must be carried out when the audio carrier is switched off. The demodulated video signal appears on pin 16 of [7710]. The AGC voltage at pin 4 is used to determine the antenna signal strength after a buffer [7717] with the signal "AGC" and an analog input port of the CC-μP. The trap [1704] reduces the sound carrier remainders in the video for BG standards. The trap [1706] works in the same way for the Pal-I standard only. For all other standards the switch [7713] is closed via [7706] and "SFS_TS"-line set "high" to bypass this trap. In these cases the selectivity of the SAW filter [1701] is sufficient. The coil [5713] for non-BG standards realizes a frequency response correction. This correction is not desired for SECAM L' and therefore short-circuited by [7716] (signal SB1 is "high" and [7702] has on-status). The demodulated video signal "VFV" is available after the buffer and limiting stage for noise peaks [7711]. The FM-PLL demodulator function of TDA 9818 is not necessary and therefore deactivated by the resistor [3739].

Audio demodulator

The sound demodulation is done by the MSP3415 [7600], which is also fully controlled via I²C-bus by the CC-μP (determination of bandwidth, amplitude, standard, ...).The audio signals are available at pin 30 and pin 31 of [7600] and fed as "AFER"- & "AFEL"-line to the audio-I/O for further processing.

9.3.4 Audio routing

Audio IO Europa Overview



The processing of audio is always done in stereo (e.g. separate left- and right-channel) and the complete switching is realized by using HEF4052, which is a dual four-to-one multiplexer. In principle there are three independent selectors:

a) Scart 1-Output-Path:

Pos [7504] is used to select either Scart 2-Input ("AIN2L"/ "AIN2R") or the signal directly from the audio DAC [7001] ("ALDAC"/"ARDAC") as the output source for Scart 1 ("AOUT1L"/"AOUT1R").

The control is done by means of the lines "ASC1S" coming from [7408] (IC [7408] acts as a port expander for the CC-µP) and "IASC1M", which is directly coming from the CC. Pos [7412] is used for level adaptation (3V3 to 5V) in between.

b) Scart 2-Output-Path:

Pos [7503] selects between Scart 1-Input ("AIN1L"/"AIN1R"), signals from the internal frontend ("AFEL"/"AFER") via MSP [7600] or audio directly from the DAC [7001] ("ALDAC"/ "ARDAC"). The outputs of this switch are routed to Scart 2 ("AOUT2L"/"AOUT2R"). This switch is controlled via "VSA1"- and "VSA2"-line. These lines come from [7408] that is acting as a port expander for the CC-µP.

c) Record-Path:

Pos [7501] selects either signals from Scart 1 ("AIN1L"/ "AIN1R") or Scart 2 ("AIN2L"/"AIN2R") or Cinch-Front ("AINFL"/ "AINFR") or the MSP [7600] ("AFEL"/"AFER") and routes to the audio ADC [7005] ("ALADC"/"ARADC") for record purposes. The switch is controlled via "RSA1"- and "RSA2"-signals. These signals come from the MSP [7600], which acts as a port expander of the CC-µP. As there can also exist a fifth input in case of DV-In is present the corresponding analog audio signals from the DVIO-board are firstly routed via extra cable and connector [1960] to the MSP. The MSP acts as a preselector between audio from internal frontend or the DV-Input.

Each of these three selectors ([7501], [7503] & [7504]) has a separate Op-Amp on the output for level-adaptation-, performance- and line-driving-reasons. [7505-A & -B] for record, [7502-C & -D] for Scart 1-Output and [7502-A & -B] respectively for Scart 2. Every audio output line on the two Scart connectors can be "killed" (muted) by a extra transistors ([7506], [7508], [7509] & [7511]), which can be activated by the "AKILL"-line. This signal is generated by the circuit around [7404]/[7421] and is a combination of the "KILL"- from the CC-µP and the "IPFAIL" of the power-supply-unit.

Additionally to analog audio the set is also equipped with a digital output via cinch plug [1951]. The signal is generated on the dig. board and routed via audio interface cable and connector [1900] to the Ana-PCB. Here the "DAOUT"-line first passes a 6-fold inverter [7580] being used as a driver and for performance reasons (noise reduction, jitter, ...). Afterwards a transformer [5580] is necessary to achieve the correct level and also to have a floating output with isolated ground before the signal is fed via [3580] to cinch plug [1951]. The capacitor [2580] performs an AC-coupling between connector- and set-ground.

9.3.5 Audio ADC/DAC

The conversion of analog audio signals from the record-selector [7501] in the I/O ("ALADC"- & "ARADC") is done via UDA1361TS [7005]. This IC can process input signals up to $2V_{rms}$ by using external resistors [3039], [3041] in series to the input pins. As the level from the DVIO-Board is only $1V_{rms}$ a

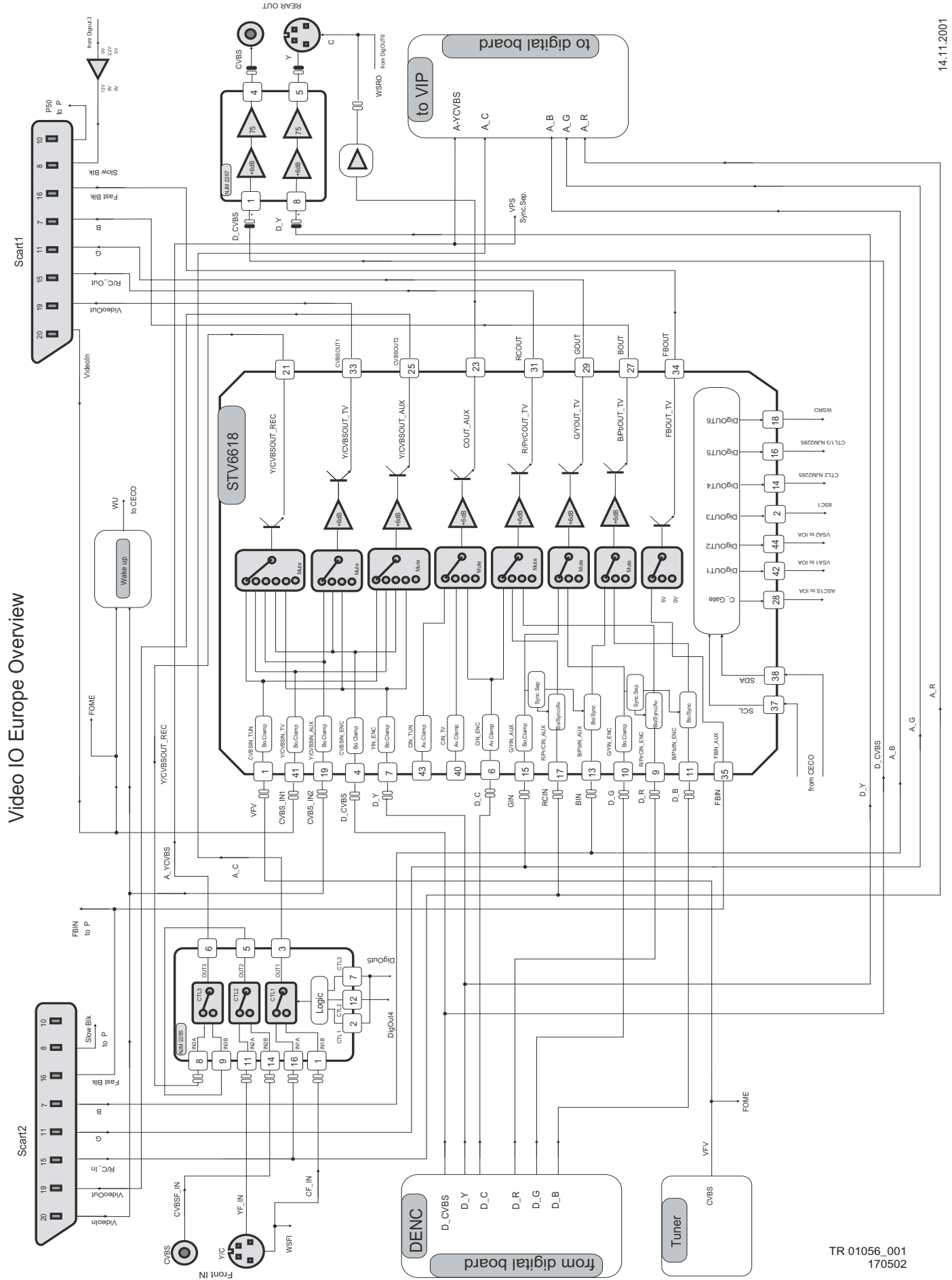
6dB step can be performed by setting pin 7 of [7005] to 3,3V via [7006] and the "PWONSW"-line controlled by the CC-µP to use the whole dynamic range of the ADC. All required clock signals are generated on the dig. board and only the audio data ("A_DAT"-line) are routed from Ana- to Dig.-PCB for further processing.

The transformation of dig. audio back into the analog domain is done by UDA1334BTS [7001]. All necessary clock signals are coming from the dig. board and dig. audio data ("D_DATA0"-line) are converted into analog signals, which are available at pin 14 and pin 16 of [7001]. Afterwards an Op-Amp. [7002] (line driver & level adaptation) and a low-pass-filter to increase signal performance (noise, distortions,...). is passed. Then both signals ("ALDAC" & "ARDAC") are directly routed to the rear cinch output and also used in the audio-I/O for further processing. The DAC has also a mute possibility, which can be activated by setting pin 8 to 3,3V via [7003]. This mute is controlled either by the dig. board ("D_IKLL"-line) or the "IPFAIL"-signal from power-supply-unit.

In addition to that the DAC [7001] and the cinch outputs can be killed (muted) in case of "digital silence" by the circuit around [7008],[7009] and [7010], when no audio data are available (e.g. "D_DATA0"-line zero).

This function can be also activated via the "ION"-line (set to high during any stand-by mode). To avoid signal distortions (clipping) the mute transistors for cinch rear out [7415], [7416] are decoupled via [7011].

9.3.6 Video-routing



The complete Video-I/O-switching is basically realized by the matrix switch STV6618 [7408], which is controlled via I²C-bus by the CC. All used outputs excluding pin 21 (Y/CVBS-REC) have a 6 dB-amplification and a 75 Ohms driver-stage inside. This IC includes also several digital outputs, which are used for switching purposes on the analog board. The record selector inside the switch selects between the CVBS from frontend ("VfV"), the input from Scart 1 ("YCVBSIN1") or the signal from Scart 2 ("YCVBSIN2"). Afterwards the signal passes another switch [7411] in which a selection between signals from the front or the preselected ones are done. The output signals of [7411] are fed as "A_YCVBS"- and "A_C"-line to the digital board for further processing.

To reduce the number of external presets there exists only one preset for CVBS- and Y/C-front. The set automatically detects between the two inputs depending on the presence of a video signal (sync separator-circuit on mP-sub-board) where Y/C has higher priority.

The R/G/B-inputs and the Fast-Blanking-line from Scart 2 are directly routed to the digital PCB. These signals are also available on the corresponding input-pins of the STV6618 to enable a loop-through in AV-Standby. In this mode the set has to behave like a cable between the two Scart-connectors. AV-Standby is activated either by a "high" level on pin 8 of Scart 2 ("active device is present") or by the "WU"-line (wake up). This signal is generated out of the circuit around [7401], [7402] & [7403] and will become "high" if there is a signal on pin 20 of Scart 1- or Scart 2. The detection of the input level on pin 8 of Scart 2 ("8SC2") is done via an analog input of the CC-µP (less than 2V means inactive; 4,5V to 7V determines a source with 16:9 picture-ratio and greater than 9,5V is an active 4:3 source).

All signals from the digital board ("D_R", "D_G", "D_B", D_C", "D_Y" and "D_CVBS" are routed to the proper inputs of the STV6618 for amplification and driving purpose before they can be seen on the appropriate Scart outputs.

Parallel to this the "D_CVBS"- and the "D_Y"-line are passing a 6 dB-amplifier and driver-IC [7410] and are then routed to the CVBS-Cinch and Y/C-out rear. The chroma signal for this Y/C out is coming from the STV6618 - which makes the 6 dB-amplification - and a driver [7406] in between.

The detection of the picture ratio information on the Y/C-input front is made by measuring the DC-level on the Chroma signal via analog input of the CC-µP ("WSFI"-line). In case the level is higher than 3,5V the input signal is a 16:9 source. If the level is lower than 2,4V the picture ratio is 4:3.

For generation of the appropriate DC-voltage on the Y/C-out rear the "WSRO"-line is controlled via pin 18 of [7408] by the CC-µP (Pin 18 set to low means 4:3, pin 18 set to high determines 16:9).

The control of the switching voltage (Pin 8 of Scart 1) is done via 3-level-pin (nr.2) of the STV6618 [7408] and the transistors [7405], [7407] & [7409]. A "low" on pin 2 of [7408] causes around 11V on pin 8-Scart 1 (e.g. source with 4:3 picture-ratio active). Medium level (2,5V) on pin 2 of the STV6618 generates medium level (approx. 6V) on pin 8-Scart 1 (e.g. active source with 16:9) and a "high" on pin 2 of the STV6618 pushes pin 8-Scart 1 to "low" (e.g. inactive).

9.3.7 VPS/PDC- and Text-Dataslicer

For extraction of relevant information out of the video signal (time controlled recording, net-name-identification, time- & date- download) the STV5348 [7931] is used. Data transfer to/ from the CC is fully done via I²C-bus and the input signal for

decoding is the same as the one being routed to the digital board for recording purposes ("A_YCVBS"-line).

9.3.8 Analog Follow-Me

This circuit compares the video signal from the internal front-end ("VfV") of the recorder with that one of the connected TV-set ("CVBS1"). The TV set delivers the signal via Scart-cable. A comparator [7934] and several additional parts ([7932], [7933], ...) are used to compare the two video signals. In case of both input signals are equal the output-line of this circuit ("FOME") is set to low. Detection is made via an input port of the CC-µP.

9.4 Analog board NAFTA- & APAC-Pal- version

9.4.1 Frontend NAFTA

[1701] demodulates the video signal from the antenna input. Tuner and IF-demodulator are in one unit. Also a modulator is included in that part. The audio- and video-signal to the modulator are the ones from the selected input or the playback path of the set ("AMCO"- and "D_CVBS"-line). The control of the tuner is fully done via I²C-bus by the CC-µP. Via the "MSW"-signal and [7701] the modulator is switched on and off. In opposite to this the antenna loop-through is opened or closed. In the APAC-Pal version POS [1700] is used with the difference that it demodulates only PAL- instead of NTSC-signals and has also no modulator. The "CSW_SSW" line switches the modulator between CH3 or CH4 in the NTSC-version.

To achieve optimal tuning the "AFC"-signal is detected by the CC via an analog input; [3701], [3702] and [3703] are used for level adaptation (5V to 3V3). Pos [7700] is a driver for the video signal.

The sound demodulation is realized by the MSP34x5 [7600], which is also fully controlled via I²C-bus by the CC-µP (determination of bandwidth, amplitude, standard, ...). The audio signals are available at pin 30 and pin 31 of [7600] and fed as "AFER"- & "AFEL"-line to the audio-I/O for further processing. As this PCB is used for different regions (NAFTA and APAC) either MSP3425 or MSP3415 are assembled.

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The sound processing is always done in stereo (that means separate left- and right-channel). The complete selection of the audio signal for recording is done by a HEF4052 [7501], which is a dual four-to-one multiplexer. The Op-Amp on the output [7504] is necessary for performance reasons and acts also as a driver. The selected signals "ARADC" and "ALADC" are directly fed to the Audio-ADC. The input lines for the selector [7501] are coming either from MSP [7600] ("AFEL"/"AFER") or cinch rear in 1 ("AIN1L"/"AIN1R") or cinch rear in 2 ("AIN2L"/"AIN2R") or the cinch in front ("AINFL"/"AINFR"). The [7501] is controlled via "RSA1"- and "RSA2"-signals coming from the MSP [7600]. The MSP acts as a port expander of the CC-μP.

As there can exist also a fifth input in case of DV-In is present the corresponding analog audio signals from the DVIO-board are firstly routed via extra cable and connector [1960] to the MSP, which acts as a preselector between audio from internal frontend or the DV-Input.

The signals from the audio DAC part ("ARDAC"/"ALDAC") are directly routed to both cinch rear outputs, which are connected in parallel. To avoid plops and any other audible noise on the output there is a mute-stage implemented [7509], [7511] for each channel. The activation is done via "AKILL"-line, which is a combination of the "KILL" from CC-μP, "DAC_Mute" from DAC-part and "IPFAIL" of the power-supply-unit. The circuit around [6430], [6431], [7430] and [7404] generates this signal.

Additionally to analog audio the set is also equipped with a digital output via cinch plug [1951]. The signal is generated on the dig. board and routed via audio interface cable and connector [1900] to the Ana-PCB. Here the "DAOUT"-line first passes a 6-fold inverter [7580] being used as a driver and for performance reasons (noise reduction, jitter, ...). Afterwards a transformer [5580] is necessary to achieve the correct level and also to have a ground isolated (floating) output before the signal is fed via [3580] to cinch plug [1951]. The capacitors POS [2580], [2582] & [2583] perform on the one side an AC-coupling between connector- and set-ground. On the other side they are necessary to keep radiation at a minimum for EMC reasons.

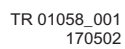
9.4.3 Audio ADC/DAC

The conversion of analog audio signals from the record-selector [7501] in the I/O ("ALADC"- & "ARADC") is done via UDA1361TS [7005]. This IC can process input signals up to $2V_{rms}$ by using an external resistor [3039], [3041] in series to the input pins. As the level from the DVIO-Board is only $1V_{rms}$ a 6dB step can be performed by setting pin 7 of [7005] to 3,3V via [7006] and "PWONSW"-line controlled by the CC-μP to use the whole dynamic range of the ADC. All required clock signals are generated on the dig. board and only the audio data ("A_DAT"-line) are routed from Ana- to Dig.-PCB for further processing.

The transformation of dig. audio back to the analog domain is done by UDA1334BTS [7001]. All necessary clock signals are coming from the dig. board and dig. audio data ("D_DATA0"-line) are converted into analog signals, which are available at pin 14 and pin 16 of [7001]. Afterwards an Op-Amp. [7002] (line driver & level adaptation) and a low-pass-filter to increase signal performance (noise, distortions,...). are passed. Then both signals ("ALDAC" & "ARDAC") are directly routed to the rear cinch output. The DAC has also a mute possibility, which can be activated by setting pin 8 to 3,3V via [7003]. This mute is controlled either by the dig. board ("D_IKLL"-line) or the "IPFAIL"-signal from power-supply-unit.

In addition to that the DAC [7001] and the cinch outputs can be killed (muted) in case of "digital silence" by the circuit around [7008],[7009] and [7010], when no audio data are available (e.g. "D_DATA0"-line zero)

Video IO NAFTA /APAC Overview



The complete Video-I/O-switching is basically realized by the matrix switch STV6618 [7408], which is controlled via I²C-bus by the CC. All used outputs excluding pin 21 (Y/CVBS-REC) have a 6dB-amplification and a 75 Ohms-driver-stage inside. This IC also includes several digital outputs, which are used for switching purposes on the analog board. The record selector inside the switch selects between the CVBS from frontend, the CVBS from Cinch-Rear or Y from the S-Video-input rear. Afterwards the signal passes another switch [7411] in which a selection between signals from the front or the preselected ones is done. The output signals of [7411] are fed as “A_YCVBS”- and “A_C”-line to the digital board for further processing.

To reduce the number of external presets there is only one station for CVBS or Y/C (front and rear). The set automatically detects between the two inputs depending on the presence of a video signal (sync separator-circuit on mP-sub-board) where Y/C has higher priority.

The Y/U/V-inputs are directly routed to the digital PCB. Only the Y-line has to be present additionally on pin 4 of [7408] for video recognition.

The signals “D_C” and “D_Y” are fed through [7408] (6dB amplification) and via [7406], [7409] used as driver to the S-Video output connector. The “D_CVBS” line is directly routed to the modulator and via the circuit around [7431] and [7432] amplified by 6dB before it is fed to the CVBS output plug.

The Y/U/V signals from the digital board are also passing [7408] for 6dB amplification and driving purpose.

To achieve optimal picture quality the set is equipped with a simple progressive scan function based on a so-called line doubler. The complete generation of the signal is done on the digital board and via a separate cable and connector [1946] the corresponding Y/U/V lines are routed to the analog PCB. As there is only one Y/U/V output available a switching between interlaced and progressive output is necessary. While the transistors [7421], [7422], [7424], [7425], [7427] and [7428] are used as driver for Y/U/V progressive, [7423], [7426] and [7429] together with [7405] are necessary for killing these signals via pin 42 of [7408] in case the interlaced is selected (“PSCAN_KILL”-line set to low). If progressive output is active the pins 27, 29 and 31 of [7408] are set to high impedance and “PSCAN_KILL” is also high (e.g. 5V).

The detection of the picture ratio information on the Y/C inputs (rear or front) is done by measuring the DC-level on the Chroma signal via an analog input of the CC-μP (“WSRI”- and “WSFI”-line). In case the level is higher than 3,5V the input signal is a 16:9 source, if the level is lower than 2,4V the picture ratio is 4:3.

For generation of the appropriate DC-voltage on the Y/C output the “WSRO”-line is controlled via pin18 of [7408] by the CC-μP (Pin 18 set to low means 4:3, pin 18 set to high determines 16:9).

During Stand-By there is also no loop-through of any input to any output performed.

9.5 Digital Board

9.5.1 Record Mode

Video Part
Analog Video input signals CVBS, YC and UV(RGB for EURO and YUV for USA) are routed via the analog board to connector 1601 and sent to IC7500 SAA7118 (Video Input Processor). Digital video input signals (DV_IN_DATA(7:0)) are sent from

the DIVIO board through the connector 1603 and further also to IC7500.
IC7500 (VIP) encodes the analog video to digital video and processes the digital video to a digital video stream (CCIR656 format). This output stream (VIP_YUV[7:0]) goes to IC7403 SAA6752H (EMPRESS) and to IC7100 Versatile Stream Manager. The latter uses the data for VBI (vertical blanking interval) extraction.
IC7403 (EMPRESS) encodes the digital video stream into a MPEG2 video stream that is fed to IC7100 (VSM).

Audio Part
I2S audio are sent from the analog board to IC7403 EMPRESS via connector 1602. The EMPRESS compresses I2S audio data into an AC3 audio stream which is fed to IC7100 (VSM).

Front-End I2S
IC7100 (VSM) interfaces directly to the different hardware modules such as Basic Engine, EMPRESS IC7403, MPEG decoder IC7200 (Sti5508) and buffers the data streams that are coming from or going to these hardware modules.
In IC7100 (VSM), the video MPEG2 stream and the audio AC3 stream are multiplexed into a I2S packetized stream. The serial data are sent to the Basic Engine to be recorded.

Loop-Through
The multiplexed audio and video stream in the VSM is fed back via the parallel front-end interface to IC7200 (Sti5508). This IC decodes the MPEG stream into analog video and I2S audio. The video and audio signals are routed to the analog board via connectors 1601 and 1602. During recording, the recorded signal is present at the outputs of the analog board.

9.5.2 Playback Mode

During playback, the serial data from the Basic Engine is going directly to the Sti5505 via the serial front-end I2S interface. The Sti5508 is a MPEG & Audio/video decoder and has the following outputs:

- To the analog board:
 - analog video RGB, YC, CVBS
 - I2S audio (PCM format)
 - SPDIF audio (digital audio output)
- To the Progressive scan board:
 - digital video YC(7:0).

9.5.3 S2B Interface

The S2B interface between the VSM (IC7100) and the Servo processor MACE3 controls the Basic Engine during record and playback mode.

9.5.4 System Clock

System clocks(27MHz) of VSM, Sti5508, EMPRESS and Progressive Scan are generated by oscillator 7906

9.5.5 Audio Clock

During record mode, the audio clock ACC_ACLK_OSC is generated by IC7102 (PLL) because then, the audio clock must be synchronized with the incoming video (VIP_FID) from the VIP.
During playback mode, the audio clock ACC_ACLK_PLL is generated by the clock synthesizer IC7900 (MK2703S). Both ACC_ACLK_OSC(also goes to the EMPRESS as ACLK_EMP) and ACC_ACLK_PLL are fed to the VSM. This IC selects the appropriate clock to the STI5508. The EMPRESS IC derives from the incoming ACLK_EMP the I2S audio encoder clocks AE_BCLK and AE_WCLK which are sent to the VSM.

9.5.6 On/Off

The digital board is not powered in standby mode. Control signal ION, coming from the analog board, will enable the PSU and power the digital board.

- ION = High: the digital board is in powered down standby mode
- ION = Low: the power supply to the digital board is enabled

9.5.7 Reset

Control signal IRESET_DIG, controlled by the microprocessor on the analog board is sent to the RESET LOGIC circuit.

- IRESET_DIG = Low in standby mode
- IRESET_DIG = High: the whole system is reset and the Digital board is waked up.

9.5.8 I2C Bus

Sti5508 is master of the I2C bus. The following IC's are controlled by the I2C bus:

- IC7201 NVRAM
- IC7403 EMPRESS
- IC7500 VIP
- IC7700 FLI2200 Video Deinterlacer Line Doubler
- IC7801 ADV7196 Video Denc

9.5.9 EMI Bus

The following IC's are connected to the External Memory Interface bus (EMI) which functions as system bus:

- IC7301 and 7302: Flash memories which contain the application and diagnostic software
- IC7100: VSM
- IC7200: MPEG AV Decoder

Block Diagram Digital Board

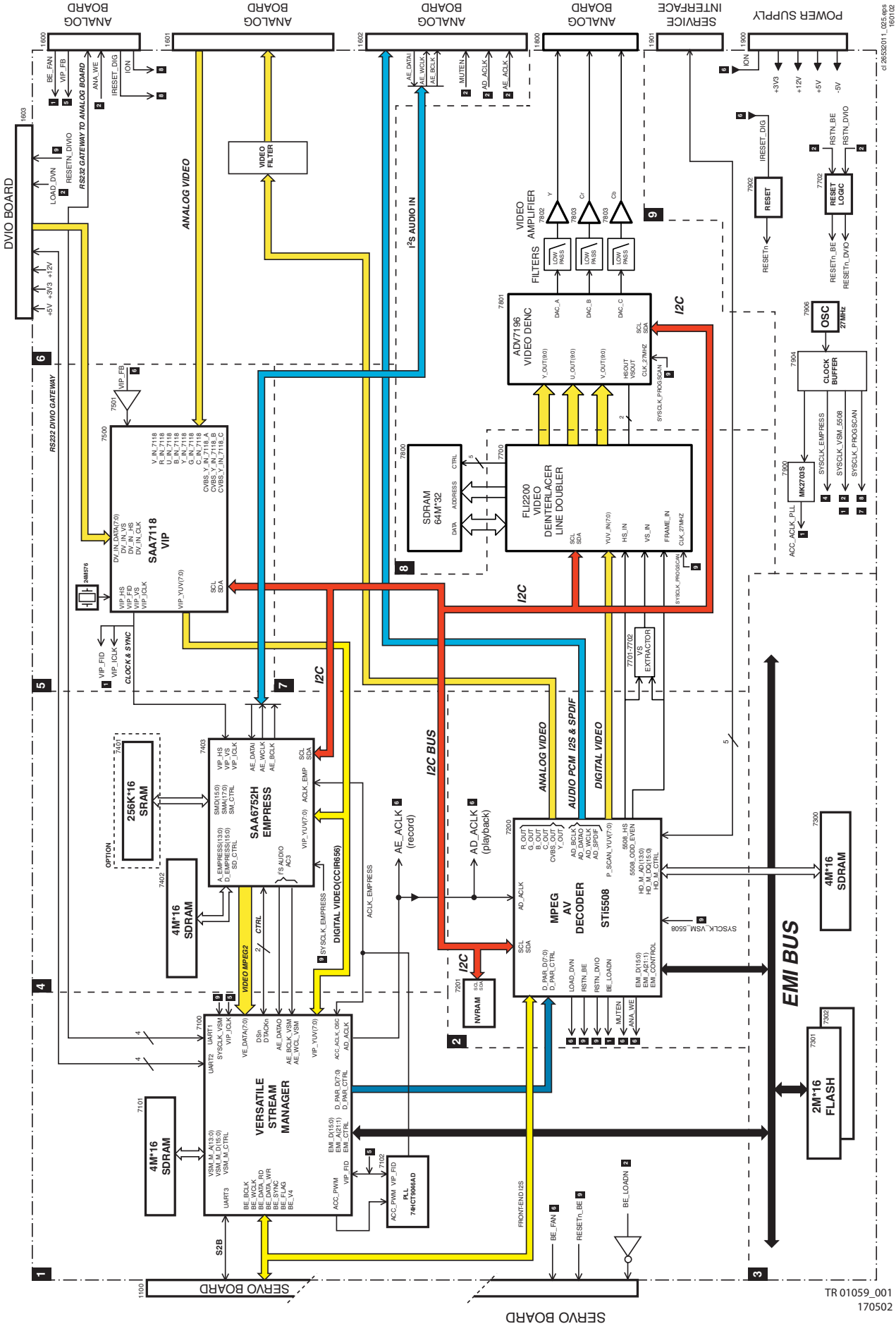


Figure 9-1

9.5.10 Progressive Scan

Description
The progressive scan part is integrated in the Digital Board and built around the SAGE Fli2200 de-interlacer / line doubler (7701). This I2C controlled de-interlacer uses a 64Mbit SDRAM (32bit x 2M) to perform high quality deinterlacing (meshing). The de-interlacer gets his digital YUV input data from the STi5508 (7200). The format of the digital YUV input to the SAGE is CCIR656 with separated Hsync, Vsync and odd/even signal running on 27Mhz. Because the STi5508 doesn't have a Vsync output the odd/even output of this IC has to be translated to a Vsync signal. Some glue logic has been added to extract the vertical sync. The glue logic circuit consists of Flip-Flop IC 74HC74D (7701) and EXOR 74LVC86 (7702). The next diagram shows how the vertical sync is extracted.

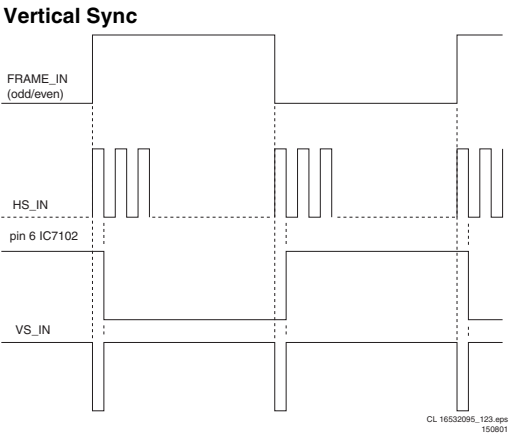


Figure 9-2

The output of the de-interlacer (4:4:4 progressive video) is fed to the Analog Devices ADV71967 MacroVision compliant DENC (7801). The YUV current output of the DENC is fed via a low pass filter to the single supply output opamps AD8061/8062 (7802-7803). The analog video is fed via a 7 poled flex to the analog board where the YUV 2FH cinch connectors are located.

9.6 Divio Board

9.6.1 Short Description of the Module:

The DVIO Module is a decoder for DV streams. The module is intended for the Philips DVDR1000/002 en DVDR1000/172 DVD+RW recorders. Input is a stream from a DV-camcorder IEEE1394. Outputs are CCIR656 Video and Analog audio (L+R). A serial control interface is present. The following picture shows the location of the DVIO Module inside the DVDR set.

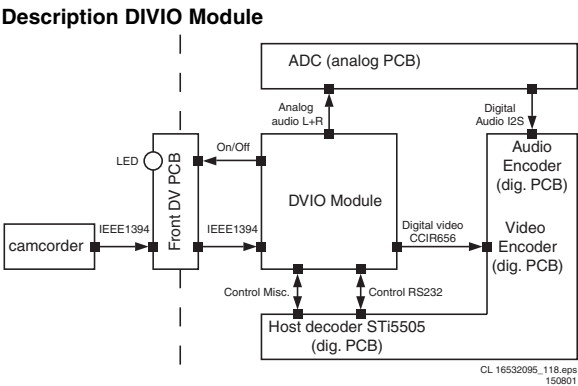


Figure 9-3

9.6.2 Block Diagram

Block Diagram DVIO

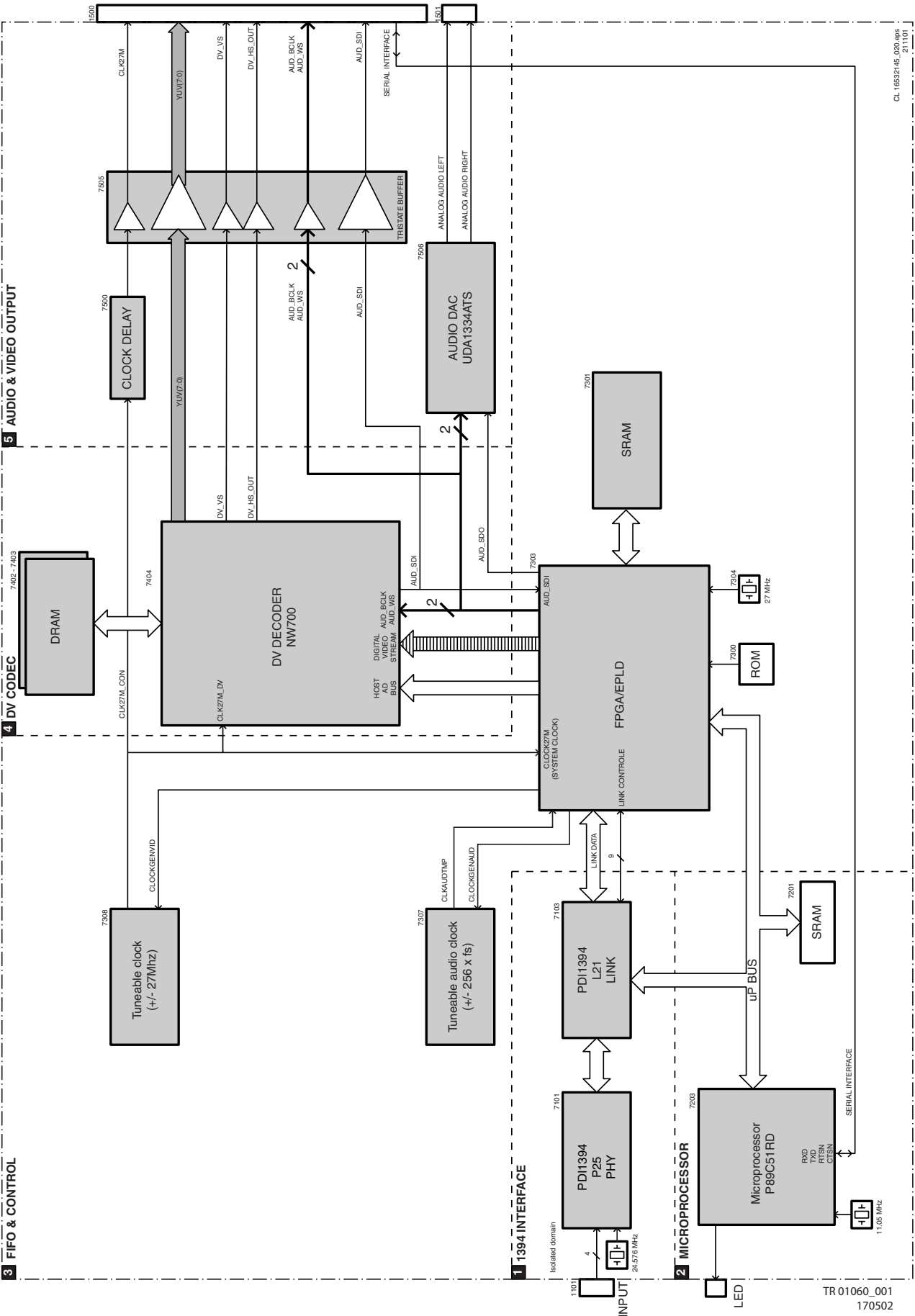


Figure 9-4

9.6.3 Functional Description

- The DVIO module consists of the following blocks (see blockdiagram):
1. IEEE1394 Interface
 - PDI1394P25(7101)
 - PDI1394L40(7103)
 2. Micro-controller
 - 89C51RD2(7203)
 - 32kb SRAM(7201)
 3. FIFO and Control
 - FPGA/EPLD(7303)
 - SRAM(7301)
 - Clock generation(7307, 7308)
 - Independently tuneable audio and video clock, implemented with FPGA and PLL
 4. DV-Decoder
 - NW700(7404)
 - EDO DRAM(7402, 7403)
 5. Audio & Video output
 - Audio DAC UDA1334ATS(7602)
 - Clock delay(7500)
 - Tristate buffer(7505)

- IEEE1394 Interface**
- The 1394 interface consists of a PDI1394P25 physical layer and a PDI1394L40 link layer.
- It has the following features:
- S200 operation (200 megabit per second)
 - One i.Link port (4 pin)
 - AV link port

- Micro-Controller**
- The 89C51RD2 processor has a 8051 cpu with the following extra features:
- 64 kilobyte of flash memory as program memory
 - 1 kilobyte of internal data memory
 - watchdog timer
 - PCA outputs
 - Power control modes
 - Speed allowed up to 33 MHz but used at 11.0592 MHz
 - On board ISP(In Circuit Programming) functionality

- ISP**
- By use of In Circuit Programming, it is possible to update the software of the DVIO board that is in the 89C51RD2. ISP can be made active by resetting the processor and keeping the ISPN pin low during reset. During ISP, the ISPN signal on the board has to be kept low. A programming voltage of 5V is always present at the Vpp pin. When the ISP mode is active, the new program can be sent to the microprocessor through the serial port.

- Fifo and Control**
- In decode mode, an isochronous AV-stream is flowing through the IEEE1394 Interface into the FPGA. The FPGA stores the data in a FIFO buffer (ping-pong buffer type, i.e. 2 buffers that can hold one whole frame each).

Reset

The FPGA controls the reset signals on the board. This has the advantage that it is possible to reset the board both from software and hardware.

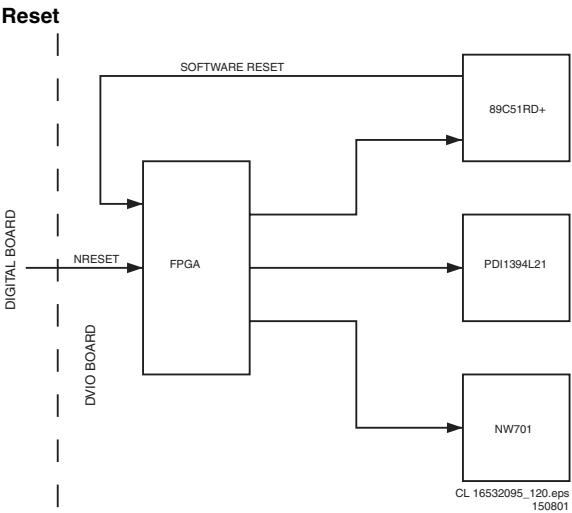


Figure 9-5

The board reset NRESET will reset the whole board, and the software reset can reset everything except the microprocessor itself. Power-on reset is implemented by adding pull-ups and pull-downs to the reset inputs of the devices. Since the FPGA will tri-state all the pins during configuration, reset is active during configuration time. After configuration of the FPGA, the reset signals are driven inactive. The NRESET signal is used to reset the DVIO board. After reset, the tri-state buffers to connector 1500 are disabled.

Clock Circuit

There are 2 clocks to consider in the system, this is the video clock and the audio clock. These two clocks do not have a relation, so these clocks must be considered independently. The video clock is approximately 27 MHz. When data is flowing from an external source that is supposed to have the same frequency, it does not have exactly the same clock. Because of this, buffers may under-run or over-run. Since the clock can not be directly recovered from the 1394 interface, there has to be another solution. This solution is a tuneable clock that is adjusted to the required frequency to process at the rate of the incoming data. The hardware implementation of such a tuneable clock is as follows:

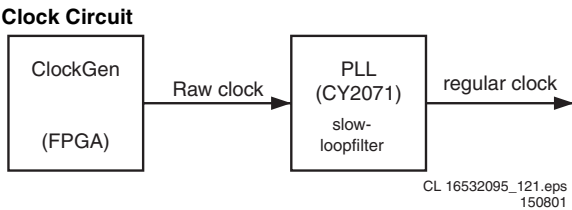


Figure 9-6

The same can be applied for the audio clock. For this clock, a frequency of 8.192 MHz, 11.2896 MHz or 12.228 MHz is required. This depends on the sample-rate frequency(32kHz, 44.1kHz or 48kHz)of the audio signal.

DV Decoder

The AV-data will go from the FIFO to the NW700. The NW700 decodes the stream into video data in 656 format and audio data in I2S format.

The microprocessor has the ability to read the status registers of the NW700 through the FPGA. By reading these registers, extra data from the DV stream, that is not decoded into audio or video, can be sent to the digital board using pin TXD of the serial interface. This data includes time stamp and some more.

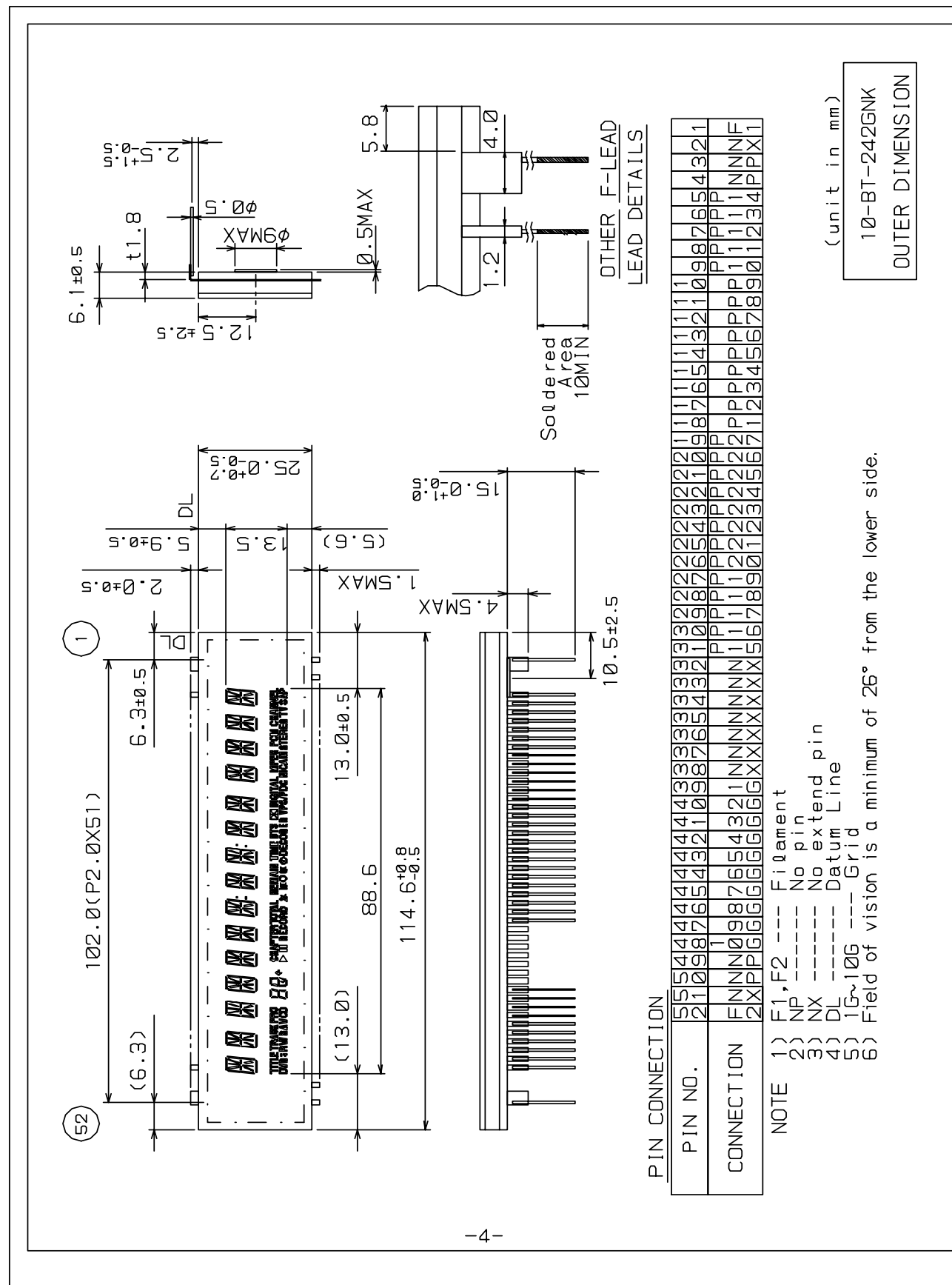
Audio & Video Output

The audio I2S data are sent to audio DAC UDA1334. Analog audio left and right signals are connected to the analog board. The tristate buffer enables the digital video stream to the Video Input Processor on the digital board when the DV source is selected.

The clock delay synchronizes the AV clock with the AV data at the output.

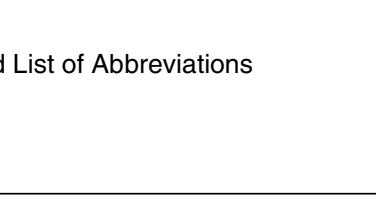
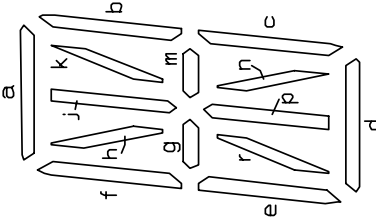
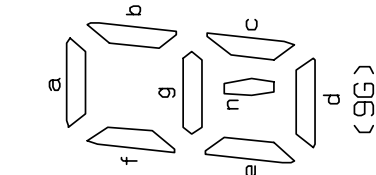
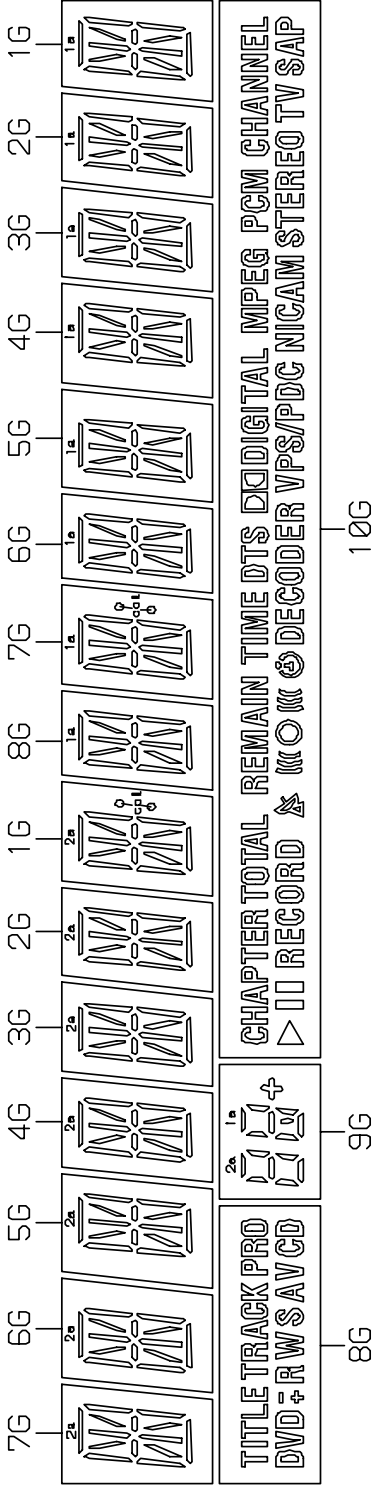
9.7 IC's Display Panel

9.7.1 IC7100



2.8

GRID ASSIGNMENT



ANODE CONNECTION										
	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G
P1	1a	1a	1a	1a	1a	1a	1a	1a	1a	PCM
P2	1j,1p	1j,1p	1j,1p	1j,1p	1j,1p	1j,1p	1j,1p	1j,1p	1f	MPEG
P3	1h	1h	1h	1h	1h	1h	1h	1h	1b	DIGITAL
P4	1k	1k	1k	1k	1k	1k	1k	1k	1g	DTS
P5	1b	1b	1b	1b	1b	1b	1b	1b	1c	TIME
P6	1f	1f	1f	1f	1f	1f	1f	1f	1e	REMAIN
P7	1m	1m	1m	1m	1m	1m	1m	1m	1n	TOTAL
P8	1g	1g	1g	1g	1g	1g	1g	1g	1d	CHAPTER
P9	1c	1c	1c	1c	1c	1c	1c	1c	+	SAP
P10	1e	1e	1e	1e	1e	1e	1e	1e	-	TV
P11	1r	1r	1r	1r	1r	1r	1r	1r	-	STEREO
P12	1n	1n	1n	1n	1n	1n	1n	1n	-	NICAM
P13	1d	1d	1d	1d	1d	1d	1d	1d	-	VPS/PDC
P14	col	-	-	-	-	-	col	-	-	CHANNEL
P15	2a	2a	2a	2a	2a	2a	2a	CD	-	DECODER
P16	2j,2p	2j,2p	2j,2p	2j,2p	2j,2p	2j,2p	2j,2p	V	-	Ⓢ (Right)
P17	2h	2h	2h	2h	2h	2h	2h	A	-	Ⓢ (Left)
P18	2k	2k	2k	2k	2k	2k	2k	S	-	Ⓢ (Left)
P19	2b	2b	2b	2b	2b	2b	2b	W	-	Ⓢ (Left)
P20	2f	2f	2f	2f	2f	2f	2f	R	-	Ⓢ (Left)
P21	2m	2m	2m	2m	2m	2m	2m	+	2d	RECORD
P22	2g	2g	2g	2g	2g	2g	2g	-	2e	Ⓢ
P23	2c	2c	2c	2c	2c	2c	2c	DVD	2c	Ⓢ
P24	2e	2e	2e	2e	2e	2e	2e	TITLE	2g	-
P25	2r	2r	2r	2r	2r	2r	2r	TRACK	2b	-
P26	2n	2n	2n	2n	2n	2n	2n	PRO	2f	-
P27	2d	2d	2d	2d	2d	2d	2d	-	2a	-

10-BT-242GNK
ANODE CONNECTION

9.8 IC's Analog Board

9.8.1 IC1705

VHF/UHF splitter-tuner

UV1316K MK3

FEATURES

- Member of UV1300 MK3 family of small-sized UHF/VHF tuners
- Integrated passive splitter
- Systems CCIR: B/G, H, L, L', I and I'; OIRT: D/K
- Digitally-controlled (PLL) tuning via I²C-bus
- Fast 400kHz I²C bus protocol compatible with 3.3V and 5V micro controllers
- Off-air, S-cable and hyperband channels
- World standardized mechanical dimensions and pinning. Horizontal mounting is optionally available.



DESCRIPTION

The UV1316K MK3 splitter - tuner belongs to the UV1300 MK3 family of tuners, which are designed to meet a wide range of TV applications. It is a full band tuner suitable for CCIR systems B/G, H, L, L', I and I'. The low IF output impedance is designed for direct drive of a wide variety of SAW filters with sufficient suppression of triple transient. In addition, it is equipped with 2 two standard items, one a 5 level Analog Digital Converter and the other an internal wide band AGC with I²C selectable TOP.

This tuner complies with the requirements of radiation, signal handling capability and immunity conforming to:

- CISPR 13 (1990) incl. amendment 1 (1992) and amendment 2 (1993) and CISPR 20
- European standards CENELEC EN55013, EN55020

MARKING

The following items of information are printed on a sticker that is on the top cover of the tuner:

- Type number
- Code number
- Origin letter of factory
- Change code
- Year and week code

ORDERING INFORMATION

TYPE	DESCRIPTION	ORDER NUMBERS
UV1316K/A I G -3	Asymmetrical IF output; IEC connector	3139 147 17001

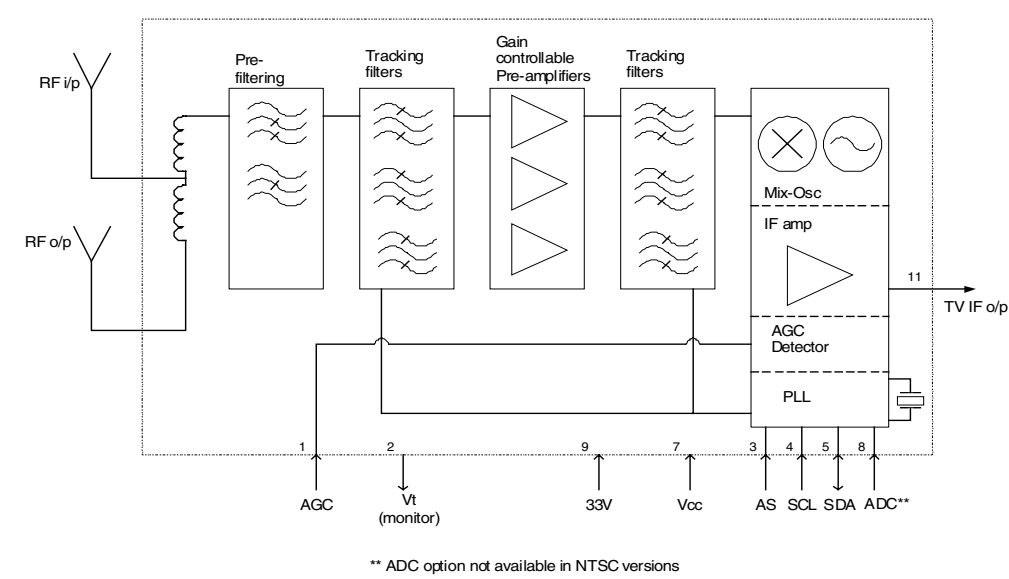
PHILIPS Components

Preliminary specification

VHF/UHF splitter-tuner

UV1316K MK3

BLOCK DIAGRAM



PINNING

SYMBOL	PIN	DESCRIPTION
AGC	1	Gain Control Voltage
TU	2	Tuning voltage
AS	3	I ² C-Bus Address Select
SCL	4	I ² C-Bus Serial Clock
SDA	5	I ² C-Bus Serial Data
n.c.	6	Not Connected
V _s	7	PLL Supply Voltage +5V
n.c./ADC	8	Not Connected / ADC Input ⁽¹⁾
V _{ST}	9	Fixed tuning Supply Voltage +33V
n.c	10	Do not connect
IF1	11	Asymmetrical IF Output
GND	M1,M2,M3,M4	Mounting Tags (Ground)



STV6618

VIDEO SWITCH MATRIX FOR DVD

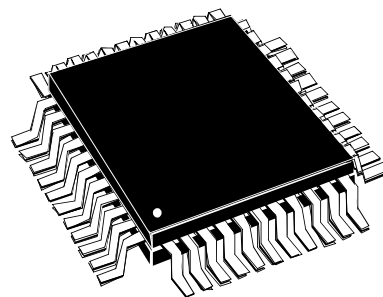
TARGET SPECIFICATION

FEATURES

- I²C Bus Control
- 5 Y/CVBS Input s, 3 Y/CVBS Output s
- 3 C Input s, 1 C Output
- 2 RGB/YPrPb In puts, 1 RGB/YPrPb Output
- 6 dB Gain on all 150 Buffer Output s
- Integrated 150 Buffers
- Video Muting on all Output s
- Bottom Clamp on all CVBS/Y, Average Clamp on C Input s, Bottom Clamp on RGB, Sync-tip Clamp on PrPb signals
- Bandwidth: 15 MHz
- Crosstalk: 50 dB

DESCRIPTION

The STV6618 is a highly integrated I²C bus-controlled video switch matrix, optimized for use in recordable Digital Video Disk applications or DVD players. It provides video routings required for connections to two external devices (Europe 2 SCARTs), internal tuners, digital encoders and recorders.



TQFP44
(10 x 10 x 1.4 mm)
(Thin Full Plastic Quad Flat Pack)

ORDER CODE: STV6618

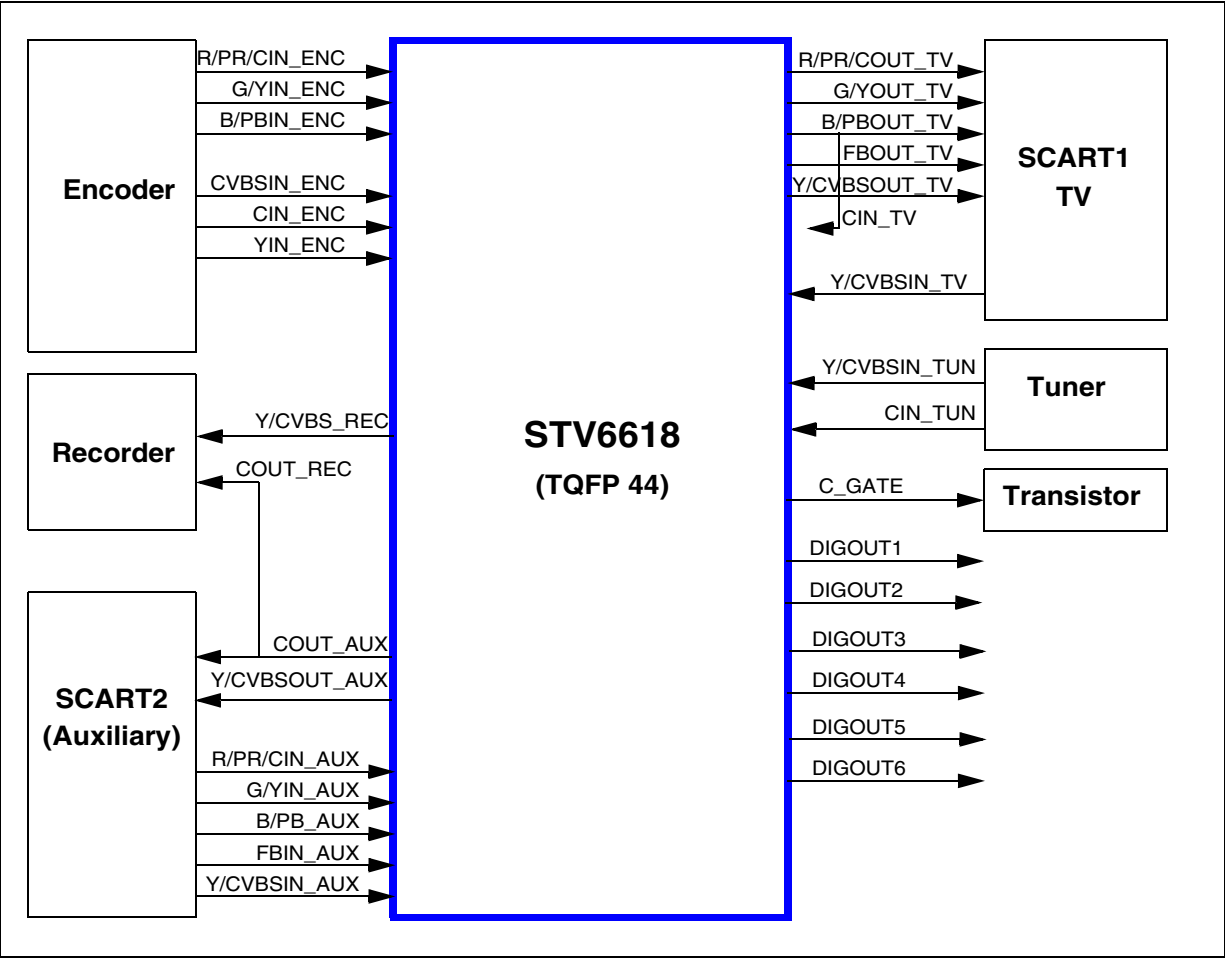
1.2 Pin Description

Pin No.	Symbol	Description
1	Y/CVBSIN_TUN	Y/CVBS Input from Tuner
2	DIGOUT3	Digital Output Pin 3
3	GND1	Ground Supply 1 for Video Inputs
4	CVBSIN_ENC	CVBS Input from Encoder
5	DECV	Video decoupling capacitor
6	CIN_ENC	Chroma Input from Encoder
7	YIN_ENC	Y Input from Encoder
8	V _{CC}	+5 V Power Supply for Video Inputs
9	R/PR/CIN_ENC	Red or Pr or Chroma Input from Encoder
10	G/YIN_ENC	Green or Y Input from Encoder
11	B/PBIN_ENC	Blue or Pb Input from Encoder
12	GND2	Ground Supply 2 for Video Inputs
13	B/PBIN_AUX	Blue or Pb Input from Auxiliary (SCART2 or external Cinch)
14	DIGOUT4	Digital Output Pin 4
15	G/YIN_AUX	Green or Y Input from Auxiliary (SCART2 or external Cinch)
16	DIGOUT5	Digital Output Pin 5
17	R/PR/CIN_AUX	Red or Pr or Chroma input from Auxiliary (SCART2 or external Cinch)
18	DIGOUT6	Digital Output Pin 6
19	Y/CVBSIN_AUX	Y/CVBS Input from Auxiliary (SCART2 or external Cinch)
20	VCCB_REC	Video Output Recorder Buffer Supply Pin
21	Y/CVBSOUT_REC	Y/CVBS Output to Recorder
22	GNDB_REC	Ground Supply for Recorder Buffer
23	COUT_AUX	Chroma Output to Auxiliary (SCART2 or external Cinch)
24	VCCB1	Video Output Buffer Supply Pin
25	Y/CVBSOUT_AUX	Y/CVBS Output to Auxiliary (SCART2 or external Cinch)
26	GNDB	Ground Supply for Video Buffer
27	B/PBOUT_TV	Blue or Pb Output to TV (SCART1 or external Cinch)
28	C_GATE	External Transistor Command for Bidirectinnal B/C SCART I/O
29	G/YOUT_TV	Green or Y Output to TV (SCART1 or external Cinch)
30	VCCB2	Video Buffer
31	R/PR/COUT_TV	Red or Pr or Chroma Output to TV (SCART1 or external Cinch)
32	VCCB3	Video Output Buffer Supply Pin
33	Y/CVBSOUT_TV	Y/CVBS Output to TV (SCART1 or external Cinch)
34	FBOUT_TV	Fast Blanking Output to TV (SCART1)
35	FBIN_AUX	Fast Blanking Input from Auxiliary (SCART2)



Pin No.	Symbol	Description
36	VDD	+5 V Digital Power Supply
37	SCL	I ² C Bus Clock
38	SDA	I ² C Bus Data
39	GNDD	Digital Ground Supply
40	CIN_TV	Chroma Input from TV (SCART1 or external Cinch)
41	Y/CVBSIN_TV	Y/CVBS Input from TV (SCART1 or external Cinch)
42	DIGOUT1	Digital Output Pin 1
43	CIN_TUN	Chroma Input from Tuner
44	DIGOUT2	Digital Output Pin 2

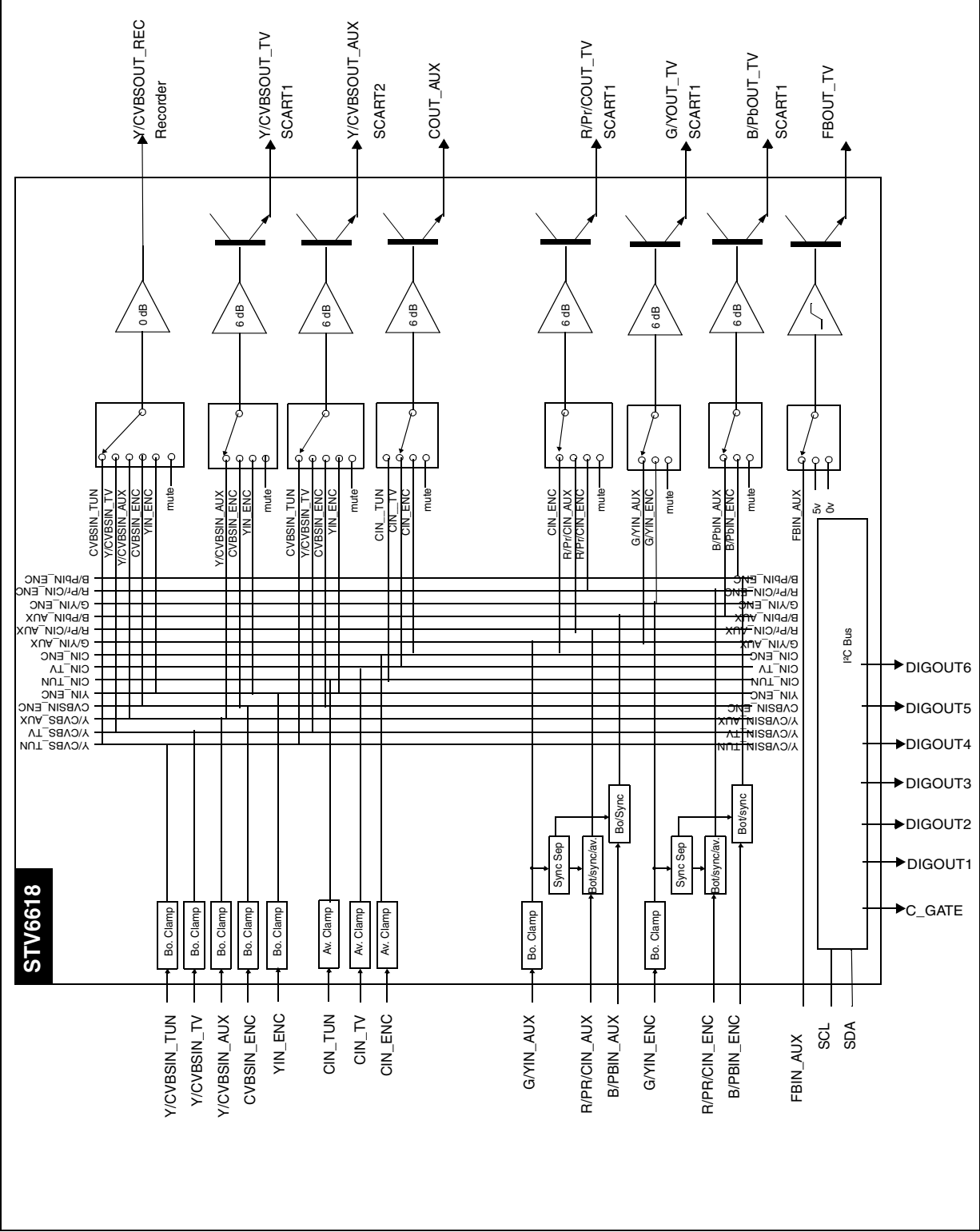
Figure 2: STV6618 Input/Output Diagram



STV6618

GENERAL OVERVIEW

Figure 3: STV6618 Block Diagram



IC7411



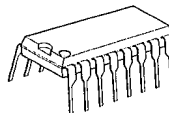
NJM2285

2-INPUT 3CHANNEL VIDEO SWITCH

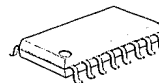
■ GENERAL DESCRIPTION

NJM2285 is a switching IC for switching over from one audio or video input signal to another. Internalizing 2 inputs, 1 output, and then each set of 3 can be operated independently. Two of them are "Clamp type", and they can be operated while setting DC level fixed in position of the video signal. It is a higher efficiency video switch, featuring the operating supply voltage 5 to 12V, the frequency feature 10MHz, and then the crosstalk 75dB (at 4.43MHz).

■ PACKAGE OUTLINE



NJM2285D



NJM2285M



NJM2285V

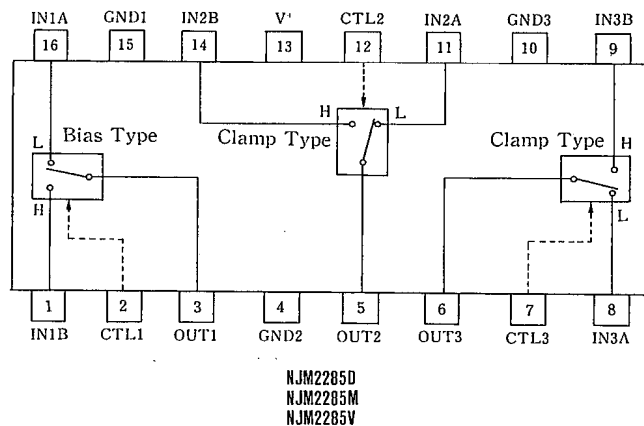
■ FEATURES

- 2 Input-1 Output
- Internalizing 3 Circuits (Two of them are "Clamp type").
- Wide Operating Supply Voltage (4.75~13.0V)
- Crosstalk 75dB(at 4.43MHz)
- Wide Bandwidth Frequency Feature 10MHz(2V_{r-p} Input)
- Package Outline DIP16, DMP16, SSOP16
- Bipolar Technology

■ APPLICATIONS

- VCR, Video Camera, AV-TV, Video Disk Player.

■ BLOCK DIAGRAM



IC7313

GreenChip™II SMPS control IC

TEA1507

FEATURES

Distinctive features

- Universal mains supply operation (70 to 276 V AC)
- High level of integration, giving a very low external component count.

Green features

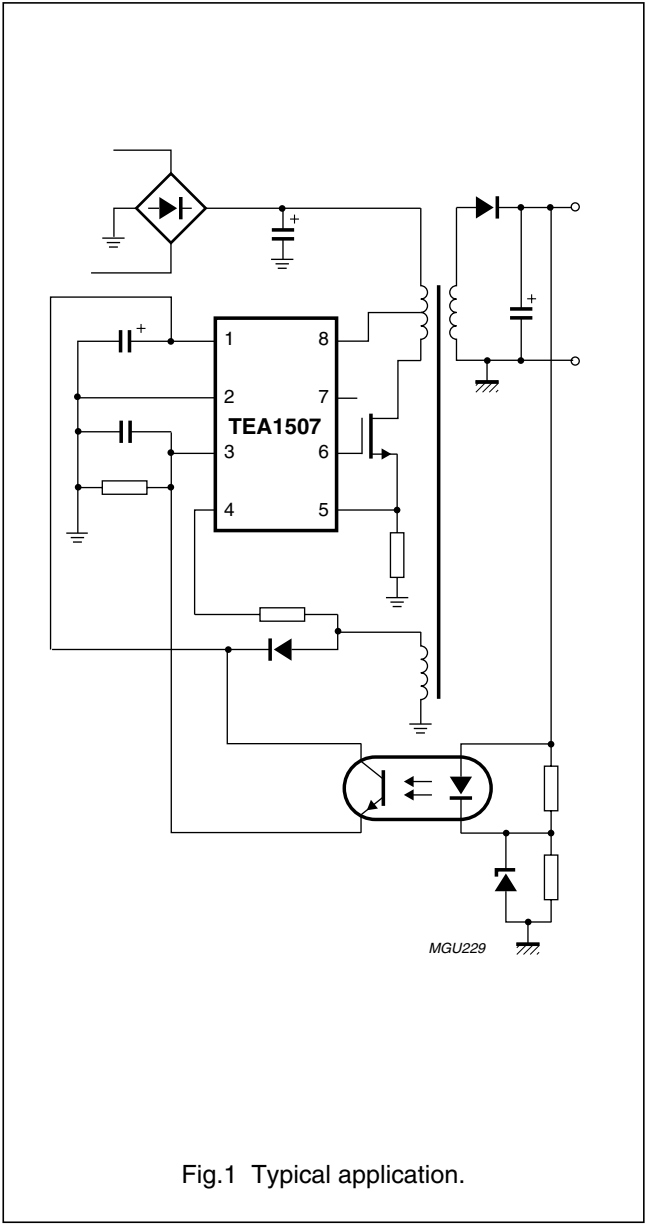
- Valley/zero voltage switching for minimum switching losses
- Efficient quasi-resonant operation at high power levels
- Frequency reduction at low power standby for improved system efficiency (<3 W)
- Burst mode operation for very low standby levels (<1 W)
- On-chip start-up current source.

Protection features

- Safe restart mode for system fault conditions
- Continuous mode protection by means of demagnetization detection (zero switch-on current)
- Accurate and adjustable overvoltage protection
- Short winding protection
- Undervoltage protection (foldback during overload)
- Overtemperature protection
- Low and adjustable overcurrent protection trip level
- Soft (re)start
- Mains voltage-dependent operation-enabling level.

APPLICATIONS

Besides typical application areas, i.e. TV and Monitor supplies, the device can be used in all applications that demand an efficient and cost-effective solution up to 250 W.



GreenChip™II SMPS control IC

TEA1507

BLOCK DIAGRAM

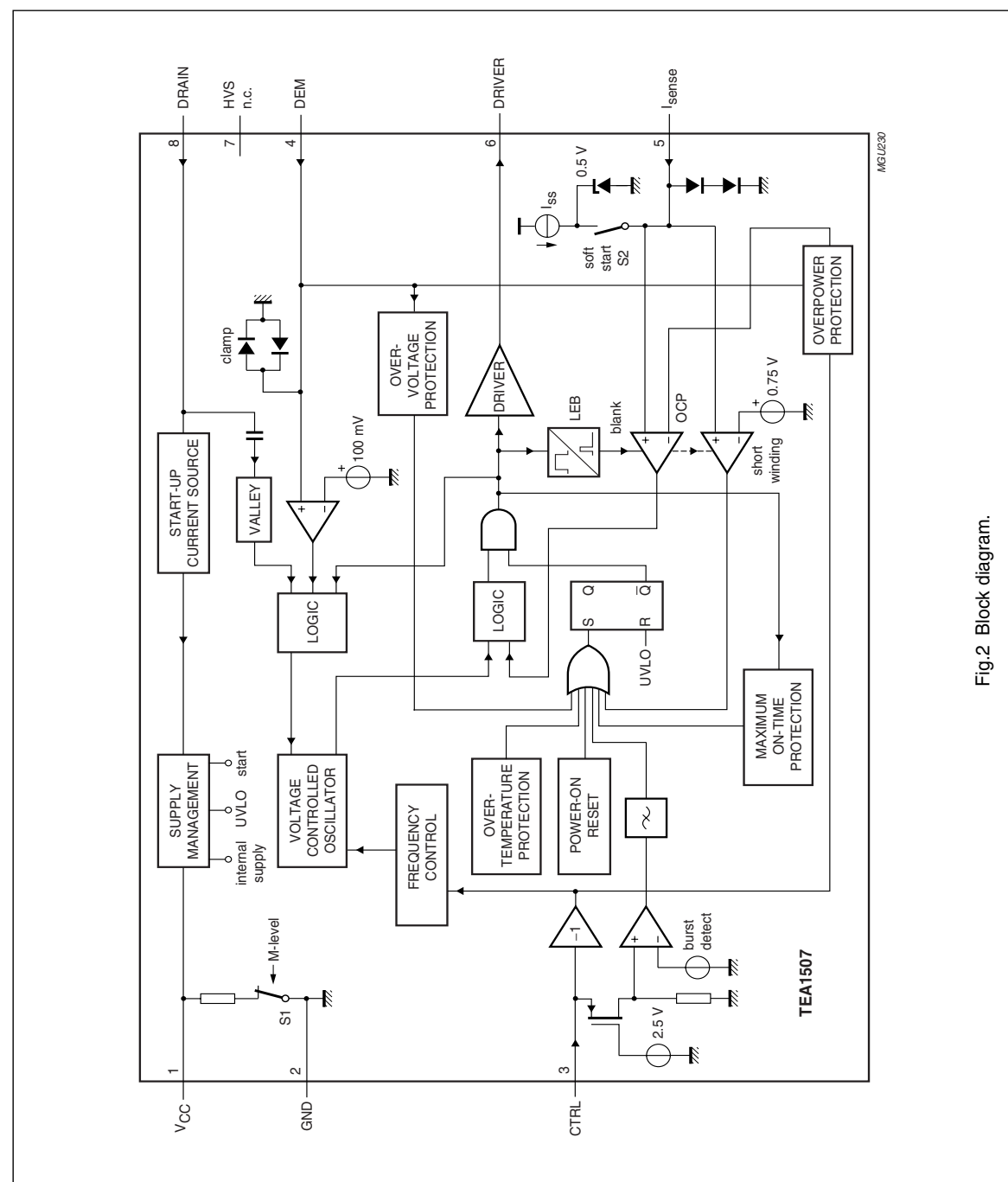



Fig.2 Block diagram.

9.9 IC’sUPC12 Sub PCB

9.9.1 IC7825

Ordering number:ENN2874A



Monolithic Linear IC

LA7213

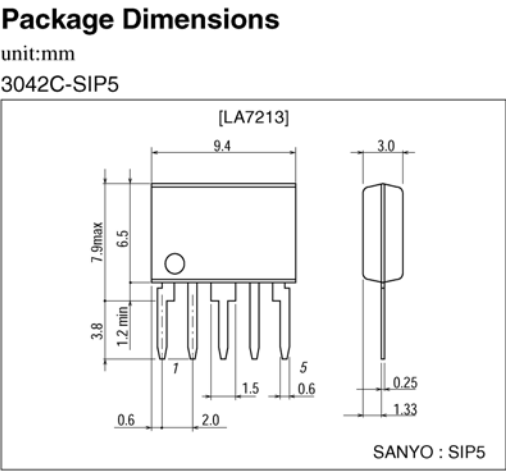
VCR-Use

Automatic Channel Selection Peripheral

Overview
The LA7213 is a VCR-use automatic channel selection peripheral IC that contains a sync separator and a vertical sync separator.

Functions and Features

- Sync separation.
- Vertical sync separation.
- Recommended supply voltage : 5V
- Open collector output (R_L=10k^Ω), negative polarity output.



Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V _{CC} max		7.0	V
Allowable power dissipation	Pd max	Ta 75°C	100	mW
Operating temperature	Topr		−15 to +75	°C
Storage temperature	Tstg		−40 to +125	°C

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V _{CC}		5.0	V
Operating voltage	V _{CC} op		4 to 6	V

Operating Characteristics at Ta = 25°C, V_{CC}=5V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Circuit current	I _{CC}	No load	0.5	0.9	1.5	mA
Sync separation operating current	I _{SYNC}	SW1=b		85		μA
Sync separation minimum input level	V _I min	Color bar signal 1Vp-p=0dB, SW1=a		−12		dB
Vertical sync separation output time delay	T _{VO} UT	Color bar of input=1Vp-p, SW1=a	5	10	20	μs
Output DC level	V ₂ H	No load	4.9			V
Output DC level	V ₂ L	No load			0.2	V
Output DC level	V ₄ H	No load	4.9			V
Output DC level	V ₄ L	No load			0.2	V

■ Any and all SANYO products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft s control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO representative nearest you before using any SANYO products described or contained herein in such applications.

■ SANYO assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO products described or contained herein.

IC7806

NCP300, NCP301

Voltage Detector Series

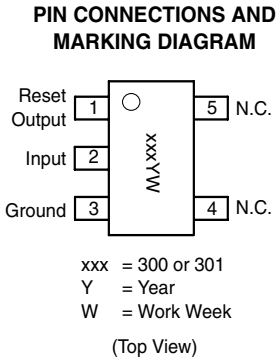
The NCP300 and NCP301 series are second generation ultra-low current voltage detectors. These devices are specifically designed for use as reset controllers in portable microprocessor based systems where extended battery life is paramount.

Each series features a highly accurate under voltage detector with hysteresis which prevents erratic system reset operation as the comparator threshold is crossed.

The NCP300 series consists of complementary output devices that are available with either an active high or active low reset output. The NCP301 series has an open drain N-channel output with either an active high or active low reset output.

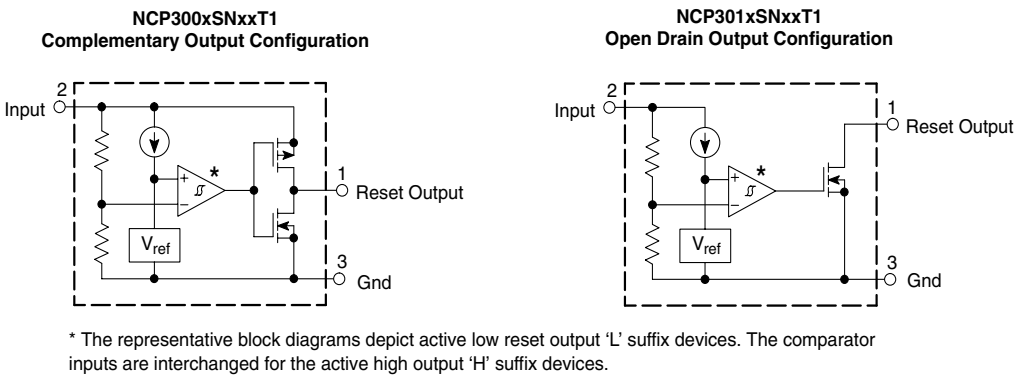
The NCP300 and NCP301 device series are available in the Thin SOT-23-5 package with seven standard under voltage thresholds. Additional thresholds that range from 0.9 V to 4.9 V in 100 mV steps can be manufactured.

- Features**
- Quiescent Current of 0.5 μ A Typical
 - High Accuracy Under Voltage Threshold of 2.0%
 - Wide Operating Voltage Range of 0.8 V to 10 V
 - Complementary or Open Drain Reset Output
 - Active Low or Active High Reset Output
- Typical Applications**
- Microprocessor Reset Controller
 - Low Battery Detection
 - Power Fail Indicator
 - Battery Backup Detection



ORDERING INFORMATION

See detailed ordering and shipping information in the ordering information section on page 23 of this data sheet.



This device contains 25 active transistors.

Figure 1. Representative Block Diagrams

NCP300, NCP301

OPERATING DESCRIPTION

The NCP300 and NCP301 series devices are second generation ultra-low current voltage detectors. Figures 21 and 22 show a timing diagram and a typical application. Initially consider that input voltage V_{in} is at a nominal level and it is greater than the voltage detector upper threshold (V_{DET+}), and the reset output (Pin 1) will be in the high state for active low devices, or in the low state for active high devices. If there is a power interruption and V_{in} becomes significantly deficient, it will fall below the lower detector threshold (V_{DET-}). This sequence of events causes the Reset output to be in the low state for active low devices, or in the

high state for active high devices. After completion of the power interruption, V_{in} will again return to its nominal level and become greater than the V_{DET+} . The voltage detector has built-in hysteresis to prevent erratic reset operation as the comparator threshold is crossed. Although these device series are specifically designed for use as reset controllers in portable microprocessor based systems, they offer a cost-effective solution in numerous applications where precise voltage monitoring is required. Figure 22 through Figure 29 shows various application examples.

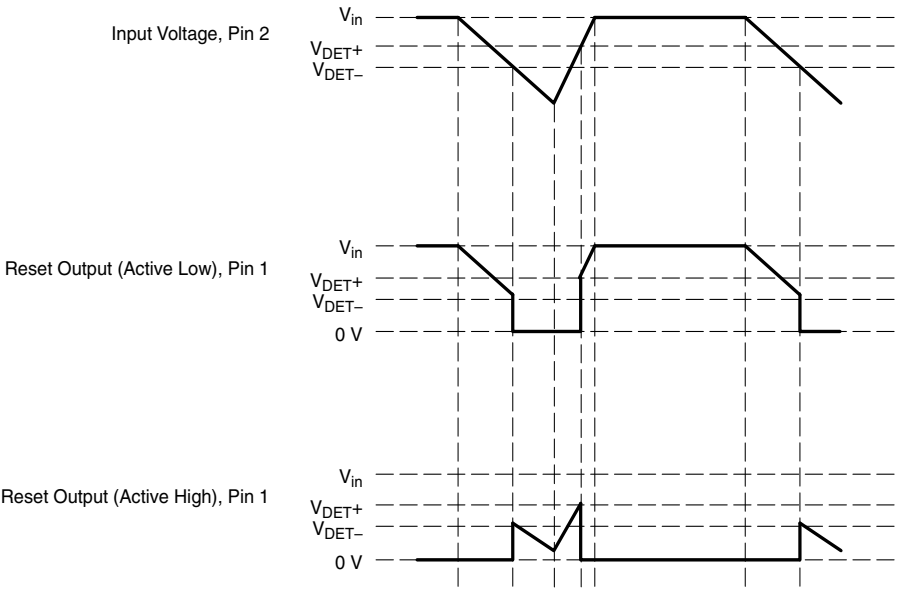


Figure 21. Timing Waveforms

9.10 IC's Digital Board

9.10.1 IC7100: VSM

VERSATILE STREAM MANAGER

GENERAL DESCRIPTION

The Versatile Stream Manager (VSM) is an ASIC used in the first generation DVD Video Recorder. Main function of the VSM is to interface directly to the different hardware modules such as Basic Engine, MPEG encoders, MPEG decoders and buffering the data streams that are coming from or going to these hardware modules.

The VSM contains a memory interface to support one 4M*16 SDRAM device. A host interface allows a CPU to directly access this memory and the VSM's internal registers.

Handling of data streams is done using scatter / gather DMA's under software control. Hardware support is provided in the VSM to support software MPEG AV multiplexing.

FEATURES

The VSM features include:

- SDRAM memory interface to support one 4 banks*1M*16 (64Mbit) SDRAM device.
- Glueless Host Interface for STM's STi5505.
- Glueless MPEG Decoder interface for STM's STi5505
- Glueless interface to Philips SAA6750 MPEG Video Encoder or SAA6752 MPEG AV Encoder.
- Glueless interface to Motorola's DSP56362 used as MPEG Audio Encoder.
- Glueless interface to Philips HDR65 as part of Basic Engine interface including the Sector Processor as also included in the STi5505.
- Audio Clock Control providing PLL loop and clock lock detection.
- Double Extraction of VBI decoded data from extended CCIR 656 stream.
- Double UART with hardware handshake and 8 byte Rx/Tx FIFO.
- Generation of additional Host Bus to support Audio Encoder DSP56362.
- Descriptor based DMA Controllers for data stream handling.
- Hardware support for software MPEG multiplex process.
- Internal Interrupt Controller to handle internal and 4 external interrupt sources.
- Operates from single 27 MHz clock input.
- JTAG for production tests.
- 3.3V logic core.
- 3.3V / 5V toleration IO pins.
- 208 PIN LQFP Package. (CR1087)

BLOCK DIAGRAM

Figure 2.1 shows the block diagram of the VSM. The hardware blocks can be divided into three categories:

- General modules: Host Interface, Memory Interface, Interrupt Controller.
- DMA Controllers.
- Functional Interfaces; the link between the actual external hardware interface and the DMA Controller. Some Functional Interfaces have knowledge about the stream coming through in order to perform for example MPEG stream characteristics extraction and insertion.

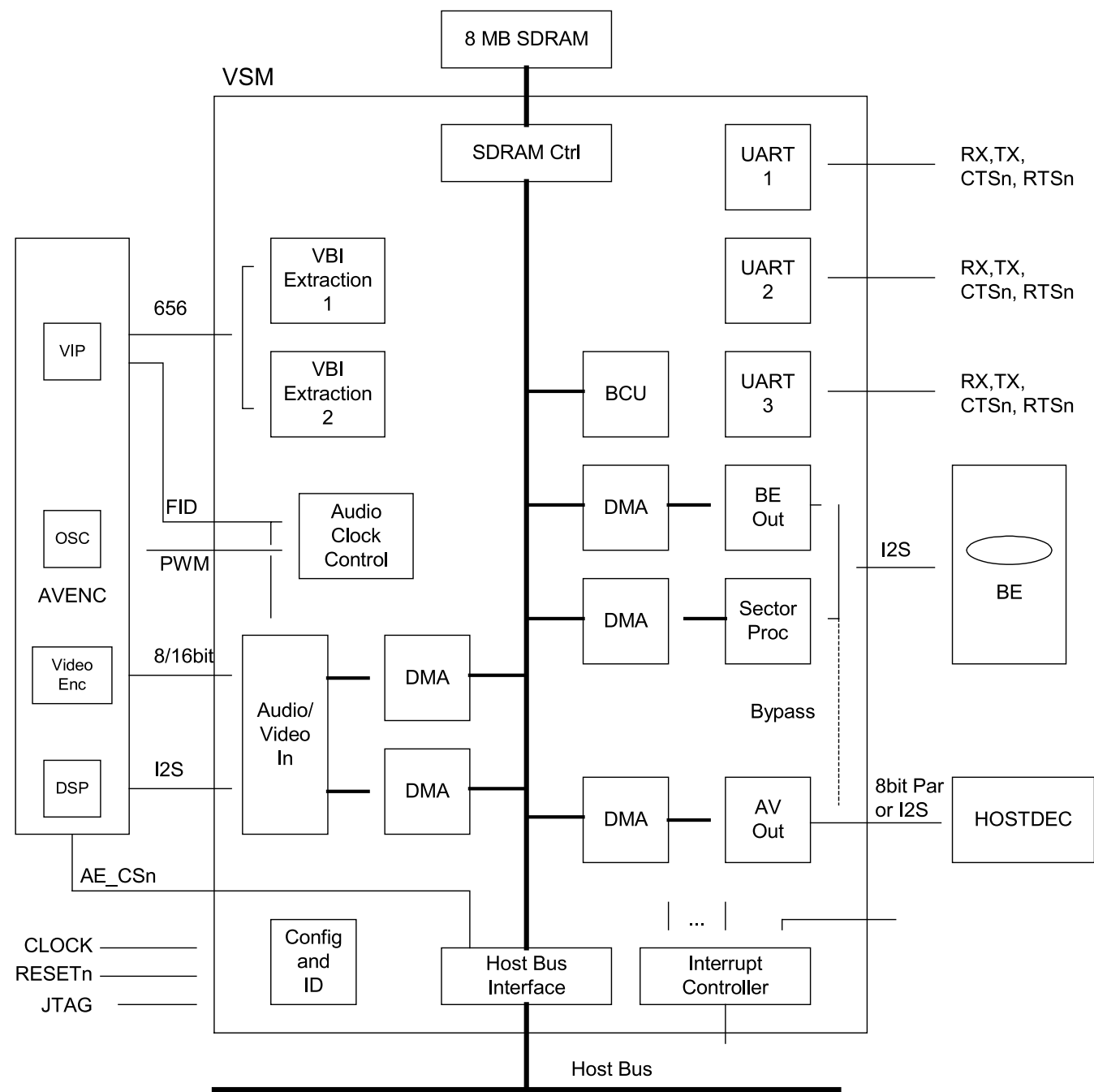


Figure 2.1: VSM Overview

PINNING

OVERVIEW

Name	Pins	Type	Function
System			
RESETn	1	In	
SYSCLK (27MHz)	1	In	
Host Interface			
HO_A(21:1)	21	In	
HO_D(15:0)	16	In/Out	
HO_BEn(1:0)	2	In	
HO_RWn	1	In	
HO_CSLn	1	In	
HO_CSHn	1	In	
HO_A22	1	In	
HO_WAIT	1	Out	
HO_PROCCLK	1	In	
Memory Interface			
M_A(13:0)	14	Out	
M_DQ(15:0)	16	In/Out	
M_RASn	1	Out	
M_CASn	1	Out	
M_WEn	1	Out	
M_LDQM	1	Out	
M_UDQM	1	Out	
M_CLKOUT	1	Out	
M_CLKEN	1	Out	
Basic Engine Interface			
BE_BCLK	1	In	
BE_DATI	1	In	
BE_WCLK	1	In	
BE_SYNC	1	In/Out	
BE_FLAG	1	In	
BE_V4	1	In	
BE_DATO	1	Out	
Video Encoder Interface			
VE_D(15:0)	16	In	
VE_DSn	1	Out	
VE_DTACKn	1	In	
VE_VIP_ERROR	1	In	Signal coming from SAA7114
Audio Encoder Interface			
AE_CSn	1	Out	
AE_BCLK	1	In/Out	(CR151,CR157)
AE_WCLK	1	In/Out	(CR151,CR157)
AE_DATA	1	In	(CR157)

Decoder Interface			
D_PAR_D(7:0)	8	Out	
D_PAR_DVALID	1	Out	
D_PAR_STR	1	Out	
D_PAR_REQ	1	In	
D_PAR_SYNC	1	Out	
D_WCLK	1	Out	
D_V4	1	Out	
Audio Clock Control			
ACC_FID	1	In	(CR200)
ACC_PWM	1	Out	
ACC_ACLK_OSC	1	In	
ACC_ACLK_DAI	1	In	
ACC_ACLK_PLL	1	In	
ACC_ACLK_DEC	1	Out	
VBI Extractor			
VBI_IPD(7:0)	8	In	
VBI_ICLK	1	In	
UART 1			
UART1_RX	1	In	
UART1_TX	1	Out (OC)	
UART1_CTSn	1	In	
UART1_RTSn	1	Out (OC)	
UART 2			
UART2_RX	1	In	
UART2_TX	1	Out (OC)	
UART2_CTSn	1	In	
UART2_RTSn	1	Out (OC)	
UART 3 (VSM1B)			
UART3_RX	1	In	
UART3_TX	1	Out	
UART3_CTSn	1	In	
UART3_RTSn	1	Out	
Interrupt Controller			
EXTINT(3:0)	4	In	From: VEnc, AEnc, BE, VSync (STi5505)
CPUINT(1:0)	2	Out (OC)	
JTAG			
TCK	1	In	Boundary Scan
TDI	1	In	
TDO	1	Out/Z	
TMS	1	In	
TRSTn	1	In	
Test			
TEST0	1	In	Amsal Test
TEST1	1	In	
Power Supply			
VDD	20	Power	10% of total pins package
VSS	20	Power	10% of total pins package
Total Pins	208		

9.10.2 IC7403: SAA6752H (EMPRESS)

MPEG-2 video and MPEG-audio/AC-3 audio
encoder with multiplexer

SAA6752HS

1 FEATURES**1.1 Video input and preprocessing**

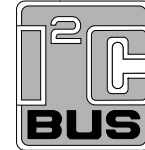
- Digital YUV input according to "ITU-R BT.656" (8 bits at 27 MHz) and "ITU-R BT.601"
- Support of enhanced "ITU-R BT.656" input format containing decoded VBI data readable via I²C-bus; Closed Caption (CC), Wide Screen Signalling (WSS) and copyright information [Copy Generation Management System (CGMS)]
- Processing of non broadcast video signals from analog VCR according to IEC 756
- Two video clock input pins for switching two digital video sources
- "ITU-R BT.601" format conversion to 1/2D1, 2/3D1 and Standard Interchange Format (SIF)
- 4 : 2 : 2 to 4 : 2 : 0 colour format conversion
- Decimation filtering for all format conversions
- Adaptive median filter and motion compensated filter for input noise reduction.

1.2 Video compression

- Real time MPEG-2 encoding compliant to Main Profile at Main Level (MP@ML) for 625 and 525 interlaced line systems
- Supported resolutions: D1, 2/3D1, 1/2D1 and SIF
- IPB frame, IP frame and I frame only encoding supported at all modes
- Supported bit rates: up to 25 Mbit/s I-only encoding; up to 15 Mbit/s IP-only or IBP encoding.
- Variable video bit rate mode for constant picture quality and constant bit rate mode to gain optimum picture quality from a fixed channel transfer rate
- Access to bit rate control parameters whilst encoding to support external real-time control algorithms (e.g. constrained variable bit rate control)
- Programmable Group Of Pictures (GOP) structure
- Innovative motion estimation with wide search range
- Adaptive quantization
- Motion compensated noise filter.

1.3 Audio input

- Audio inputs: I²S format or EIAJ format (16, 18 or 20 bits), master or slave mode at 32, 44.1 and 48 kHz
- Two digital I²S input ports for selection between two digital audio sources



- Audio clock generation: $256/384 \times f_s$ (48 kHz) locked to video frame rate (if video is present)
- Sample rate conversion to 48 kHz (locked to video frame rate) for slave mode operation in all modes except Digital Versatile Disc (DVD) compliant bypass.

1.4 Audio compression

- Dolby®⁽¹⁾ Digital Consumer Encoding (DDCE) also known as AC-3⁽²⁾ 2 channel audio encoding at 256 kbit/s or 384 kbit/s (only for SAA6752HS/01)
- MPEG-1 layer 2 audio encoding at 256 kbit/s or 384 kbit/s
- Input data bypass for Linear Pulse Code Modulation (LPCM) and compressed audio data [MPEG-1, MPEG-2, Dolby® Digital (DD) and Digital Theatre System (DTS)] according to IEC 61937
- Preamble Pc, Preamble Pd and bit stream information captured for identification of modes during bypass of compressed audio data for MPEG-1, MPEG-2, DD and DTS according to IEC 61937
- Audio mute via I²C-bus control for all modes except DVD-compliant bypass.

1.5 Stream multiplexer

- Multiplexing of video and audio streams according to the MPEG-2 systems standard ("ISO 13818-1")
- Generation and output of MPEG-2 Transport Streams (TS), MPEG-2 Program Streams (PS), Packetized Elementary Streams (PES) and Elementary Streams (ES) compliant to the DVD, D-VHS and DVB standards
- MPEG time stamp (PTS/DTS/SCR/PCR) generation and insertion (synchronization)
- Insertion of metadata
- Optional generation of empty time slots for subsequent insertion of application specific data packets
- Optional insertion of user data in the GOP header and in the picture header.

(1) Dolby is a registered trademark of Dolby Laboratories Licensing Corporation.

(2) AC-3 is a registered trademark of Dolby Laboratories Licensing Corporation.

MPEG-2 video and MPEG-audio/AC-3 audio encoder with multiplexer	SAA6752HS
<div><div>1.6 Output interface</div><div><ul style="list-style-type: none">• Parallel interface 8-bit master/slave output• 3-state output port• Glueless interfacing with IEEE 1394 chip sets (for example, PDI 1394 L11)• Data Expansion Bus Interface (DEBI) interface.</div><div>1.7 Control domain</div><div><ul style="list-style-type: none">• All control done via I²C-bus• I²C-bus slave transceiver up to 400 kHz• I²C-bus slave address select pin• Host interrupt flag pin.</div><div>1.8 Other features</div><div><ul style="list-style-type: none">• Single external clock or single crystal 27 MHz• Separate 27 MHz system clock output• Interface voltage 3.3 V• TTL compatible digital outputs• Power supply voltage 3.3 and 2.5 V• Boundary Scan Test (BST) supported• Power-down mode• Single SDRAM system memory (16 Mbit@16 bit or 64 Mbit@16 bit).</div><div>2 GENERAL DESCRIPTION</div><div>2.1 General</div><div><p>Philips Semiconductors' second generation real time MPEG-2 encoder, the SAA6752HS, is a highly integrated single chip audio and video encoding solution with very flexible multiplexing functionality. With our expertise in two critical areas for consumer video encoding, noise filtering and motion estimation, we have pushed the boundaries for video quality even further, providing enhanced quality for low bit rates and enabling increased recording times for a given storage capacity. The SAA6752HS will also enable a key driver for new consumer digital recording applications; system cost reduction. By integrating all audio encoding and multiplexing functionality we will be moving from a three chip to a one chip system, with cost efficient design and process technology, thus providing a truly low cost, high quality encoding system.</p></div></div>	<div><p>The SAA6752HS/02 is intended for customers whose application does not require the DDCE function.</p><p>The SAA6752HS gives significant advantages to customers developing digital recording applications:</p><ul style="list-style-type: none">• Fast time-to-market and low development resources: By adding a simple external video input processor IC, audio analog-to-digital converter, and an external SDRAM, analog video and audio sources are compressed into high quality MPEG-2 video and MPEG-1 layer 2 or AC-3 audio streams, multiplexed into a single program or transport stream for simple connection to various storage media or broadcast media. Hence, making design effort for our customers a minimum, as well as removing the need for in-depth experience in MPEG encoding.• Low system host resources: All video and audio encoding algorithms and software are run on an internal MIPS®⁽¹⁾ processor. The SAA6752HS only requires small amount of communication from system host processor to set up and control required encoding parameters via I²C-bus.</div> <div>2.2 Application ?elds</div> <div>2.2.1 DVD BASED OPTICAL DISC RECORDERS (DVD+RW, DVD-RW, DVD-RAM)</div> <div><p>Emerging optical disc based recording systems target to replace the existing consumer recording (VCR) and playback (DVD and VCD) products. The first generation recordable DVD based products will want to maximise recording times for the 4.7 Gbyte storage capacity. For these systems the SAA6752HS is critical, with its superior noise filtering and motion estimation, in enabling high quality at low bit rates.</p><p>Playback compatibility with existing DVD decoding solutions will also be important, which is why the SAA6752HS provides Dolby® digital consumer (AC-3) audio encoding to allow playback through existing players implementing DDCE (AC-3) decoding dominant in current DVD platforms.</p><p>The DVD stream is based on MPEG Program Stream (PS). The SAA6752HS directly outputs MPEG PS compliant to the DVD standard.</p></div> <div>(1) MIPS is a registered trademark of MIPS Technologies.</div>

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- 2.2.2HDD BASED TIME SHIFT RECORDING

Hard Disc Drive (HDD) based time-shift systems enable Personalized TV (PTV) functionality, providing consumers with new powers of control over what and when to watch broadcast content. With the audio and video content recorded digitally, identification, search and retrieval becomes a `no brainer' task as compared to traditional VCR functionality. Combine this with electronic program guides and intelligent control, and the PTV can also analyse the viewers watching habits to search for programs likely to be of interest and automatically recorded in anticipation of the viewers preferences.

Since HDD recorders are closed systems, the recording format stream can be proprietary. SAA6752HS flexible multiplexing formats, support a number of recording stream formats for HDD including MPEG Transport Stream (TS) or MPEG Packetized Elementary Stream (PES).
- 2.2.3DIGITAL VCR (DVHS) RECORDING

A DVHS player records streams based on MPEG Transport Streams (TS) packed in logical tape tracks. The SAA6752HS output streams are compliant with DVHS standard requirements.
- 2.2.4VIDEO EDITING/TRANSMISSION/SURVEILLANCE/CONFERENCEING

The SAA6752HS can operate as a stand-alone device in all above applications. The SAA6752HS' full features and flexibility allows customers to tailor functionality and performance to specific application requirements. All required control settings such as GOP size and bit rate modes can be selected via I²C-bus.

3 QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V _{DDP}	digital supply voltage (pad cells)	3.0	3.3	3.6	V
V _{DDCO}	digital supply voltage (core)	2.3	2.5	2.7	V
V _{DDA}	analog supply voltage (oscillator and PLL)	2.3	2.5	2.7	V
I _{DD(tot)}	analog + digital supply current	407	453	525	mA
P _{tot}	total power dissipation	1.2	1.4	1.9	W
f _{DCXO}	quartz frequency (digital controlled tuning)	27 × (1 – 200 × 10 ⁻⁶)	27	27 × (1 + 200 × 10 ⁻⁶)	MHz
f _{SDRAM}	SDRAM clock frequency	–	108	–	MHz
f _{SCL}	I ² C-bus input clock frequency	100	–	400	kHz
B	output bit-rate	1.5	–	25	Mbit/s
V _{IH}	HIGH-level digital input voltage	1.7	–	3.6	V
V _{IL}	LOW-level digital input voltage	–0.5	–	+0.7	V
V _{OH}	HIGH-level digital output voltage	V _{DDP} – 0.4	–	V _{DDP}	V
V _{OL}	LOW-level digital output voltage	0	–	0.4	V
T _{amb}	ambient temperature	0	–	70	°C

4 ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
SAA6752HS/01 ⁽¹⁾	SQFP208	plastic shrink quad ?at package; 208 leads (lead length 1.3 mm);	SOT316-1
SAA6752HS/02 ⁽²⁾		body 28 × 28 × 3.4 mm; high stand-off height	

- Notes
1.

MPEG-2 video and MPEG-audio/AC-3 audio encoder with multiplexer.
2.

MPEG-2 video and MPEG-audio encoder with multiplexer, but without AC-3 audio encoder.

MPEG-2 video and MPEG-audio/AC-3 audio
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5 BLOCK DIAGRAM

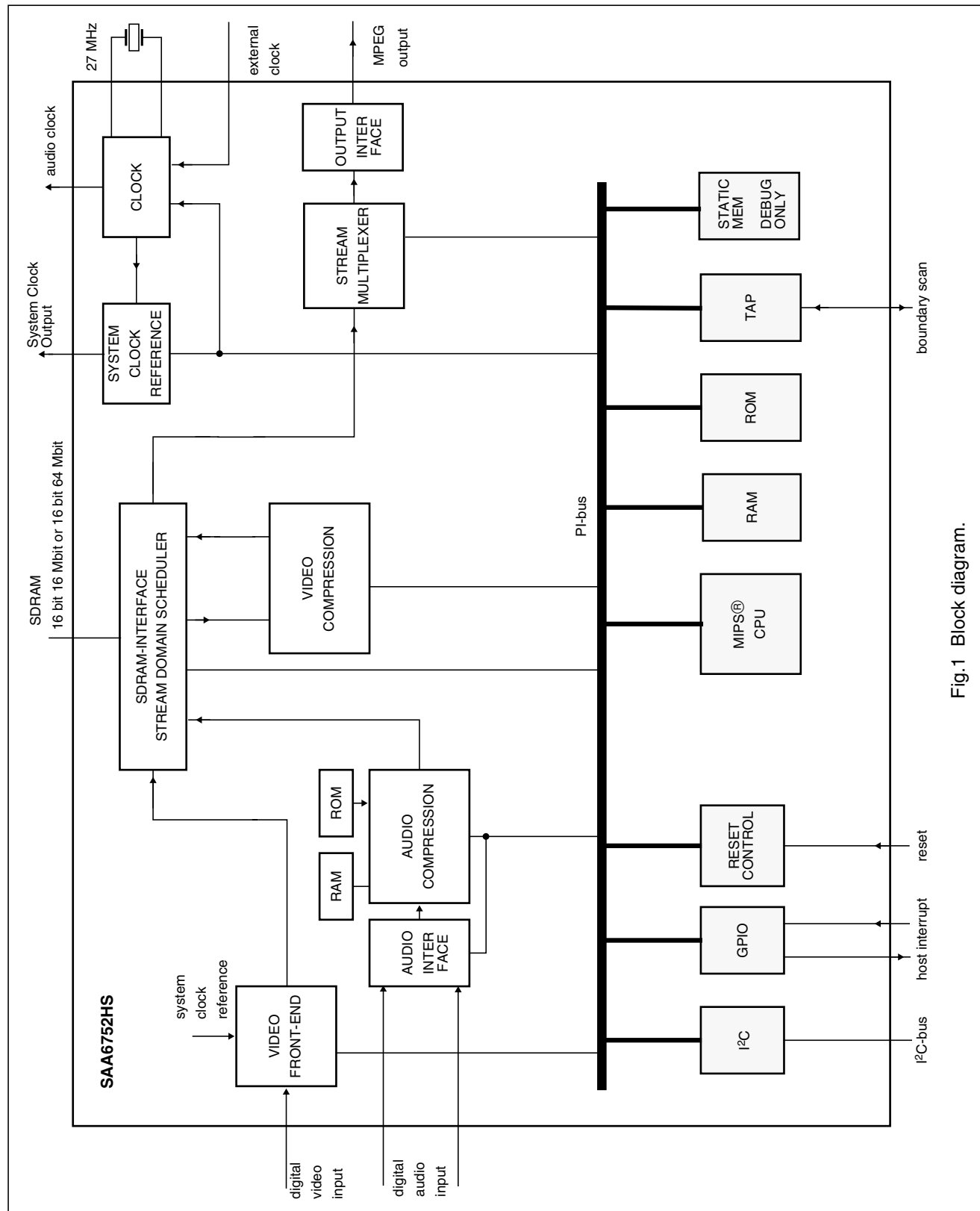


Fig.1 Block diagram.

MPEG-2 video and MPEG-audio/AC-3 audio
encoder with multiplexer

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6 PINNING

SYMBOL	PIN	INPUT/OUTPUT ⁽¹⁾	I _{max} (mA)	DESCRIPTION
V _{SSP}	1	ground	–	pad ground
SDATA1	2	input	–	I ² S-bus serial data input port 1 with internal pull-down resistor
SCLK1	3	input/output	4	I ² S-bus serial clock port 1 with internal pull-down resistor
SWS1	4	input/output	4	I ² S-bus word select port 1 with internal pull-down resistor
V _{DDP}	5	supply	–	pad ring supply voltage (3.3 V)
SDATA2	6	input/output	4	I ² S-bus serial data port 2 with internal pull-down resistor
SCLK2	7	input/output	4	I ² S-bus serial clock port 2 with internal pull-down resistor
SWS2	8	input/output	4	I ² S-bus word select port 2 with internal pull-down resistor
ACLK	9	output	4	audio clock output (256 × f _s or 384 × f _s)
V _{SSP}	10	ground	–	pad ground
IDQ	11	input	–	reserved (recommended connect to pin V _{SSP}) with internal pull-down resistor
YUV0	12	input	–	video input signal bit 0 (LSB)
YUV1	13	input	–	video input signal bit 1
YUV2	14	input	–	video input signal bit 2
YUV3	15	input	–	video input signal bit 3
YUV4	16	input	–	video input signal bit 4
YUV5	17	input	–	video input signal bit 5
YUV6	18	input	–	video input signal bit 6
YUV7	19	input	–	video input signal bit 7 (MSB)
V _{SSP}	20	ground	–	pad ground
HSYNC	21	input	–	horizontal sync input (video) with internal pull-down resistor
VSYNC	22	input	–	vertical sync input (video) with internal pull-down resistor
FID	23	input	–	video ?eld identi?cation input (odd/even ?eld) with internal pull-down resistor
VCLK1	24	input	–	video clock input 1 (27 MHz) with internal pull-down resistor
V _{SSCO}	25	ground	–	core ground
V _{SSCO}	26	ground	–	core ground
V _{DDCO}	27	supply	–	core supply voltage (2.5 V)
V _{DDCO}	28	supply	–	core supply voltage (2.5 V)
V _{DDP}	29	supply	–	pad ring supply voltage (3.3 V)
VCLK2	30	input	–	video clock input 2 (27 MHz) with internal pull-down resistor
PDOAV	31	3-state output	4	parallel stream data output for audio/video identi?er
PDIDS	32	input	–	parallel stream data input for data strobe (request for packet in Data Expansion Bus Interface (DEBI) slave mode) with internal pull-up resistor
PDOSYNC	33	3-state output	4	parallel stream data output for packet sync
V _{SSP}	34	ground	–	pad ground
PDOVAL	35	3-state output	4	parallel stream data valid output with internal pull-up resistor
PDO0	36	3-state output	4	parallel stream data output bit 0 (LSB)

MPEG-2 video and MPEG-audio/AC-3 audio
encoder with multiplexer

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SYMBOL	PIN	INPUT/OUTPUT ⁽¹⁾	I _{max} (mA)	DESCRIPTION
PDO1	37	3-state output	4	parallel stream data output bit 1
PDO2	38	3-state output	4	parallel stream data output bit 2
V _{DDP}	39	supply	–	pad ring supply voltage (3.3 V)
PDO3	40	3-state output	4	parallel stream data output bit 3
PDO4	41	3-state output	4	parallel stream data output bit 4
PDO5	42	3-state output	4	parallel stream data output bit 5
PDO6	43	3-state output	4	parallel stream data output bit 6
V _{SSP}	44	ground	–	pad ground
PDO7	45	3-state output	4	parallel stream data output bit 7 (MSB)
PDIOCLK	46	input/output	4	parallel stream clock input/output
I2CADDRSEL	47	input	–	I ² C-bus address select input with internal pull-up resistor
SD_DQ15	48	input/output	8	SDRAM data input/output bit 15 (MSB)
V _{DDP}	49	supply	–	pad ring supply voltage (3.3 V)
SD_DQ0	50	input/output	8	SDRAM data input/output bit 0 (LSB)
SD_DQ14	51	input/output	8	SDRAM data input/output bit 14
SD_DQ1	52	input/output	8	SDRAM data input/output bit 1
V _{SSP}	53	ground	–	pad ground
SD_DQ13	54	input/output	8	SDRAM data input/output bit 13
SD_DQ2	55	input/output	8	SDRAM data input/output bit 2
SD_DQ12	56	input/output	8	SDRAM data input/output bit 12
V _{DDP}	57	supply	–	pad ring supply voltage (3.3 V)
SD_DQ3	58	input/output	8	SDRAM data input/output bit 3
SD_DQ11	59	input/output	8	SDRAM data input/output bit 11
SD_DQ4	60	input/output	8	SDRAM data input/output bit 4
SD_DQ10	61	input/output	8	SDRAM data input/output bit 10
V _{SSP}	62	ground	–	pad ground
SD_DQ5	63	input/output	8	SDRAM data input/output bit 5
SD_DQ9	64	input/output	8	SDRAM data input/output bit 9
SD_DQ6	65	input/output	8	SDRAM data input/output bit 6
SD_DQ8	66	input/output	8	SDRAM data input/output bit 8
V _{DDP}	67	supply	–	pad ring supply voltage (3.3 V)
SD_DQ7	68	input/output	8	SDRAM data input/output bit 7
SD_DQM1	69	output	8	SDRAM data mask enable output bit 1
SD_DQM0	70	output	8	SDRAM data mask enable output bit 0 (LSB)
SD_WE	71	output	8	SDRAM write enable output (active LOW)
V _{SSP}	72	ground	–	pad ground
SD_CAS	73	output	8	SDRAM column address strobe output (active LOW)
SD_CLK	74	output	8	SDRAM clock output
SD_RAS	75	output	8	SDRAM row address strobe output (active LOW)
SD_CKE	76	output	8	SDRAM clock enable output

MPEG-2 video and MPEG-audio/AC-3 audio
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SYMBOL	PIN	INPUT/OUTPUT ⁽¹⁾	I _{max} (mA)	DESCRIPTION
V _{SSCO}	77	ground	–	core ground
V _{SSCO}	78	ground	–	core and substrate ground
V _{DDCO}	79	supply	–	core supply voltage (2.5 V)
V _{DDCO}	80	supply	–	core supply voltage (2.5 V)
V _{DDP}	81	supply	–	pad ring supply voltage (3.3 V)
SD_CS	82	output	8	SDRAM chip select output (active LOW)
SD_A13	83	output	8	SDRAM address output bit 13 (bank selection for 64 Mbit)
SD_A9	84	output	8	SDRAM address output bit 9
SD_A8	85	output	8	SDRAM address output bit 8
V _{SSP}	86	ground	–	pad ground
SD_A11	87	output	8	SDRAM address output bit 11 (bank selection for 16 Mbit)
SD_A7	88	output	8	SDRAM address output bit 7
SD_A12	89	output	8	SDRAM address output bit 12 (bank selection for 64 Mbit)
SD_A6	90	output	8	SDRAM address output bit 6
V _{DDP}	91	supply	–	pad ring supply voltage (3.3 V)
SD_A10	92	output	8	SDRAM address output bit 10
SD_A5	93	output	8	SDRAM address output bit 5
SD_A0	94	output	8	SDRAM address output bit 0 (LSB)
SD_A4	95	output	8	SDRAM address output bit 4
V _{SSP}	96	ground	–	pad ground
SD_A1	97	output	8	SDRAM address output bit 1
SD_A3	98	output	8	SDRAM address output bit 3
SD_A2	99	output	8	SDRAM address output bit 2
SD_DQM3	100	output	8	reserved (do not connect)
V _{DDP}	101	supply	–	pad ring supply voltage (3.3 V)
SD_DQM2	102	output	8	reserved (do not connect)
SD_DQ31	103	input/output	8	reserved (do not connect)
SD_DQ16	104	input/output	8	reserved (do not connect)
V _{SSP}	105	ground	–	pad ground
SD_DQ30	106	input/output	8	reserved (do not connect)
SD_DQ17	107	input/output	8	reserved (do not connect)
SD_DQ29	108	input/output	8	reserved (do not connect)
V _{DDP}	109	supply	–	pad ring supply voltage (3.3 V)
SD_DQ18	110	input/output	8	reserved (do not connect)
SD_DQ28	111	input/output	8	reserved (do not connect)
SD_DQ19	112	input/output	8	reserved (do not connect)
SD_DQ27	113	input/output	8	reserved (do not connect)
V _{SSP}	114	ground	–	pad ground
SD_DQ20	115	input/output	8	reserved (do not connect)
SD_DQ26	116	input/output	8	reserved (do not connect)

MPEG-2 video and MPEG-audio/AC-3 audio
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SYMBOL	PIN	INPUT/OUTPUT ⁽¹⁾	I _{max} (mA)	DESCRIPTION
V _{SSCO}	77	ground	–	core ground
V _{SSCO}	78	ground	–	core and substrate ground
V _{DDCO}	79	supply	–	core supply voltage (2.5 V)
V _{DDCO}	80	supply	–	core supply voltage (2.5 V)
V _{DDP}	81	supply	–	pad ring supply voltage (3.3 V)
SD_CS	82	output	8	SDRAM chip select output (active LOW)
SD_A13	83	output	8	SDRAM address output bit 13 (bank selection for 64 Mbit)
SD_A9	84	output	8	SDRAM address output bit 9
SD_A8	85	output	8	SDRAM address output bit 8
V _{SSP}	86	ground	–	pad ground
SD_A11	87	output	8	SDRAM address output bit 11 (bank selection for 16 Mbit)
SD_A7	88	output	8	SDRAM address output bit 7
SD_A12	89	output	8	SDRAM address output bit 12 (bank selection for 64 Mbit)
SD_A6	90	output	8	SDRAM address output bit 6
V _{DDP}	91	supply	–	pad ring supply voltage (3.3 V)
SD_A10	92	output	8	SDRAM address output bit 10
SD_A5	93	output	8	SDRAM address output bit 5
SD_A0	94	output	8	SDRAM address output bit 0 (LSB)
SD_A4	95	output	8	SDRAM address output bit 4
V _{SSP}	96	ground	–	pad ground
SD_A1	97	output	8	SDRAM address output bit 1
SD_A3	98	output	8	SDRAM address output bit 3
SD_A2	99	output	8	SDRAM address output bit 2
SD_DQM3	100	output	8	reserved (do not connect)
V _{DDP}	101	supply	–	pad ring supply voltage (3.3 V)
SD_DQM2	102	output	8	reserved (do not connect)
SD_DQ31	103	input/output	8	reserved (do not connect)
SD_DQ16	104	input/output	8	reserved (do not connect)
V _{SSP}	105	ground	–	pad ground
SD_DQ30	106	input/output	8	reserved (do not connect)
SD_DQ17	107	input/output	8	reserved (do not connect)
SD_DQ29	108	input/output	8	reserved (do not connect)
V _{DDP}	109	supply	–	pad ring supply voltage (3.3 V)
SD_DQ18	110	input/output	8	reserved (do not connect)
SD_DQ28	111	input/output	8	reserved (do not connect)
SD_DQ19	112	input/output	8	reserved (do not connect)
SD_DQ27	113	input/output	8	reserved (do not connect)
V _{SSP}	114	ground	–	pad ground
SD_DQ20	115	input/output	8	reserved (do not connect)
SD_DQ26	116	input/output	8	reserved (do not connect)

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SYMBOL	PIN	INPUT/OUTPUT ⁽¹⁾	I _{max} (mA)	DESCRIPTION
SD_DQ21	117	input/output	8	reserved (do not connect)
SD_DQ25	118	input/output	8	reserved (do not connect)
V _{DDP}	119	supply	–	pad ring supply voltage (3.3 V)
SD_DQ22	120	input/output	8	reserved (do not connect)
SD_DQ24	121	input/output	8	reserved (do not connect)
SD_DQ23	122	input/output	8	reserved (do not connect)
EXTCLK	123	input	–	27 MHz external clock input with internal pull-up resistor
V _{SSP}	124	ground	–	pad ground
V _{SSA}	125	ground	–	oscillator analog ground
XTALI	126	analog input	–	crystal oscillator input (27 MHz); note 2
XTALO	127	analog output	–	crystal oscillator output (27 MHz)
V _{DDA}	128	supply	–	oscillator analog supply voltage (2.5 V)
V _{SSCO}	129	ground	–	core ground
V _{SSCO}	130	ground	–	core ground
V _{DDCO}	131	supply	–	core supply voltage (2.5 V)
V _{DDCO}	132	supply	–	core supply voltage (2.5 V)
V _{DDP}	133	supply	–	pad ring supply voltage (3.3 V)
TDI	134	input	–	boundary scan test data input; pin must ?oat or set to HIGH during normal operating; with internal pull-up resistor; note 3
TMS	135	input	–	boundary scan test mode select; pin must ?oat or set to HIGH during normal operating; with internal pull-up resistor; note 3
TCK	136	input	–	boundary scan test clock; pin must be set to LOW during normal operating; with internal pull-up resistor; note 3
TDO	137	3-state output	4	boundary scan test data output; pin not active during normal operating; with 3-state output; note 3
V _{SSP}	138	ground	–	pad ground
TRST	139	input	–	test reset input (active LOW), for boundary scan test (with internal pull-up); notes 3 and 4
CLKOUT	140	output	4	27 MHz system clock output
TEST0	141	input/output	4	reserved (do not connect)
TEST1	142	input/output	4	reserved (do not connect)
V _{DDP}	143	supply	–	pad ring supply voltage (3.3 V)
TEST2	144	input/output	4	reserved (do not connect)
SDA	145	input/open-drain output	–	serial data input/output (I ² C-bus)
SCL	146	input/open-drain output	–	serial clock input/output (I ² C-bus)
RESET	147	input	–	reset input (active LOW); with internal pull-up resistor
V _{SSP}	148	ground	–	pad ground
RTS	149	output	4	reserved (do not connect); Universal Asynchronous Receiver/Transmitter (UART) request to send output (active LOW)

MPEG-2 video and MPEG-audio/AC-3 audio
encoder with multiplexer

SAA6752HS

SYMBOL	PIN	INPUT/OUTPUT ⁽¹⁾	I _{max} (mA)	DESCRIPTION
CTS	150	input	–	reserved (recommended connect to pin V _{DDP}); UART clear to send input; external static memory select input (active LOW); with internal pull-up resistor
RXD	151	input	–	reserved (recommended connect to pin V _{DDP}); UART receive data; internal boot select input; with internal pull-up resistor
TXD	152	output	4	reserved (do not connect); UART transmit data
V _{DDP}	153	supply	–	pad ring supply voltage (3.3 V)
SM_LB	154	input/output	4	reserved (do not connect)
SM_UB	155	input/output	4	reserved (do not connect)
H_IRF	156	3-state output	4	host interrupt ?ag output; with internal pull-up resistor
V _{SSP}	157	ground	–	pad ground
SM_OE	158	output	4	reserved (do not connect), static memory output enable output (active LOW)
SM_A9	159	output	4	reserved (do not connect), static memory address output bit 9
SM_A10	160	output	4	reserved (do not connect), static memory address output bit 10
V _{DDP}	161	supply	–	pad ring supply voltage (3.3 V)
SM_A8	162	output	4	reserved (do not connect), static memory address output bit 8
SM_A11	163	output	4	reserved (do not connect), static memory address output bit 11
SM_A7	164	output	4	reserved (do not connect), static memory address output bit 7
SM_A12	165	output	4	reserved (do not connect), static memory address output bit 12
V _{SSP}	166	ground	–	pad ground
SM_A6	167	output	4	reserved (do not connect), static memory address output bit 6
SM_A13	168	output	4	reserved (do not connect), static memory address output bit 13
SM_A5	169	output	4	reserved (do not connect), static memory address output bit 5
SM_A14	170	output	4	reserved (do not connect), static memory address output bit 14
V _{DDP}	171	supply	–	pad ring supply voltage (3.3 V)
SM_WE	172	output	4	reserved (do not connect), static memory write enable output (active LOW)
SM_D7	173	input/output	4	reserved (do not connect), static memory data input/output bit 7 with internal pull-down resistor
SM_D8	174	input/output	4	reserved (do not connect), static memory data input/output bit 8 with internal pull-down resistor
SM_D6	175	input/output	4	reserved (do not connect), static memory data input/output bit 6 with internal pull-down resistor
V _{SSP}	176	ground	–	pad ground
SM_D9	177	input/output	4	reserved (do not connect), static memory data input/output bit 9 with internal pull-down resistor
SM_D5	178	input/output	4	reserved (do not connect), static memory data input/output bit 5 with internal pull-down resistor
SM_D10	179	input/output	4	reserved (do not connect), static memory data input/output bit 10 with internal pull-down resistor

MPEG-2 video and MPEG-audio/AC-3 audio
encoder with multiplexer

SAA6752HS

SYMBOL	PIN	INPUT/OUTPUT ⁽¹⁾	I _{max} (mA)	DESCRIPTION
SM_D4	180	input/output	4	reserved (do not connect), static memory data input/output bit 4 with internal pull-down resistor
V _{SSCO}	181	ground	–	internal pre-driver and substrate ground
V _{SSCO}	182	ground	–	core ground
V _{DDCO}	183	supply	–	core supply voltage (2.5 V)
V _{DDCO}	184	supply	–	internal pre-driver supply voltage (2.5 V)
V _{DDP}	185	supply	–	pad ring supply voltage (3.3 V)
SM_D11	186	input/output	4	reserved (do not connect), static memory data input/output bit 11 with internal pull-down resistor
SM_D3	187	input/output	4	reserved (do not connect), static memory data input/output bit 3 with internal pull-down resistor
SM_D12	188	input/output	4	reserved (do not connect), static memory data input/output bit 12 with internal pull-down resistor
SM_D2	189	input/output	4	reserved (do not connect), static memory data input/output bit 2 with internal pull-down resistor
V _{SSP}	190	ground	–	pad ground
SM_D13	191	input/output	4	reserved (do not connect), static memory data input/output bit 13 with internal pull-down resistor
SM_D1	192	input/output	4	reserved (do not connect), static memory data input/output bit 1 with internal pull-down resistor
SM_D14	193	input/output	4	reserved (do not connect), static memory data input/output bit 14 with internal pull-down resistor
SM_D0	194	input/output	4	reserved (do not connect), static memory data input/output bit 0 (LSB) with internal pull-down resistor
V _{DDP}	195	supply	–	pad ring supply voltage (3.3 V)
SM_D15	196	input/output	4	reserved (do not connect), static memory data input/output bit 15 (MSB) with internal pull-down resistor
SM_CS3	197	output	4	reserved (do not connect), static memory chip select output for external ROM or RAM (active LOW)
SM_A4	198	output	4	reserved (do not connect), static memory address output bit 4
SM_A3	199	output	4	reserved (do not connect), static memory address output bit 3
V _{SSP}	200	ground	–	pad ground
SM_A2	201	output	4	reserved (do not connect), static memory address output bit 2
SM_A15	202	output	4	reserved (do not connect), static memory address output bit 15
SM_A1	203	output	4	reserved (do not connect), static memory address output bit 1
SM_A16	204	output	4	reserved (do not connect), static memory address output bit 16
V _{DDP}	205	supply	–	pad ring supply voltage (3.3 V)
SM_A0	206	output	4	reserved (do not connect), static memory address output bit 0 (LSB)
SM_A17	207	output	4	reserved (do not connect), static memory address output bit 17 (MSB)
SM_CS0	208	output	4	reserved (do not connect)

IC7700:FLI2200

FLI2200

Description

The FLI2200 is a single chip implementation of Faroudja Laboratories’ award winning deinterlacing and post-processing algorithms that produce the highest quality progressive video output from a variety of interlaced video inputs including 525/60 (NTSC) or 625/50 (PAL or SECAM). It uses patented and patent pending motion-adaptive deinterlacing that selects the optimal filtering on a per-pixel basis. This includes detection and proper interleaving of 3:2 and 2:2 pulldown for film-base sources, including continuous monitoring and compensation for bad edits that occur frequently in broadcast material due to poor scene cuts or insertion of commercials. Video material is processed by a set of content-sensitive spatio-temporal filters that adapt to the appropriate direction for smoothest interpolation using the patented Faroudja DCDi™ algorithm. The FLI2200 also includes motion-adaptive cross-color suppression that removes highly objectionable coloration artifacts produced by commonly used video decoders. Its internal processing uses 10 bits per channel to maintain the highest quality. Its inputs and outputs are 10 bits/channel for best quality but also supports 8 bits/channel for more cost-sensitive applications. The FLI2200 requires 4 MB of low cost SDRAM for best quality deinterlacing, but it can also be operated in an optimized intra-field mode without memory for more cost-sensitive applications. This makes possible the use of a single design for both high-end and low-end applications. The FLI2200 integrates a number of functions to provide maximum flexibility in a low cost configuration. This includes an on-chip clock generator, SDRAM controller, display controller, input and output color-space converters. It uses a standard 2-wire serial control interface for easy control and access to the registers. The FLI2200 can be connected without glue logic to the FLI2000 video decoder and FLI2220 Enhancer and OSD Generator to produce the highest quality video pipeline for premium applications. It is also fully compatible with other decoders having a ITU-R BT 656 output format.

Applications

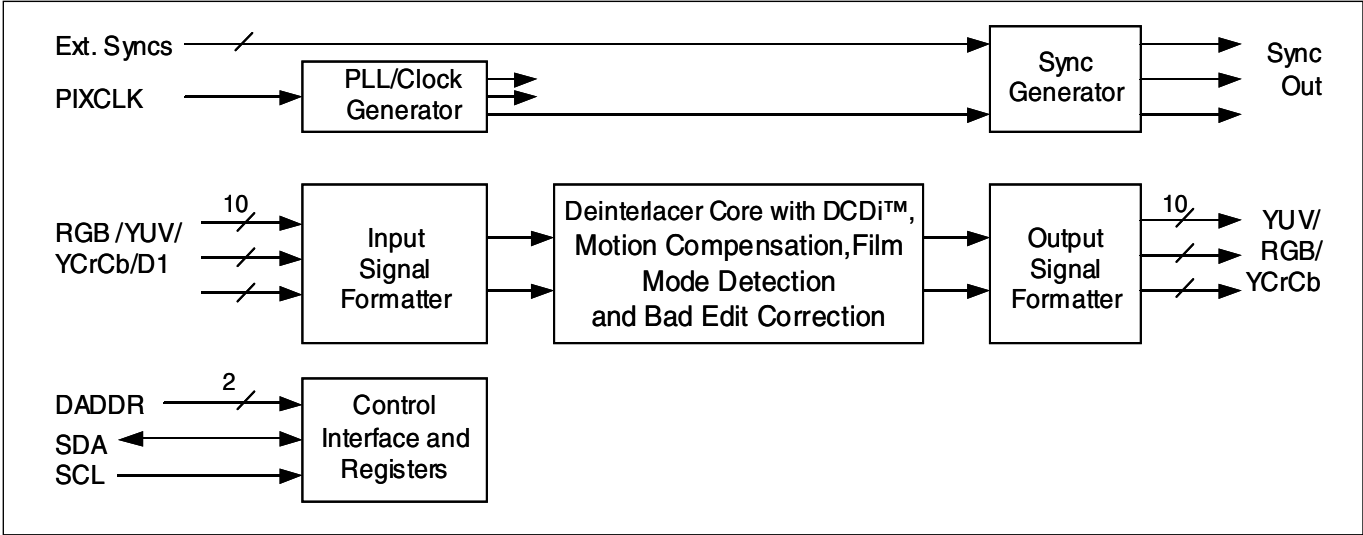
- Flat panel TV – LCD, PDP
- Progressive scan TVs
- Multimedia front/rear projectors
- Home Theater
- Scan Converters
- Multimedia PCs/Workstations

DCDi™ is a Faroudja trademark

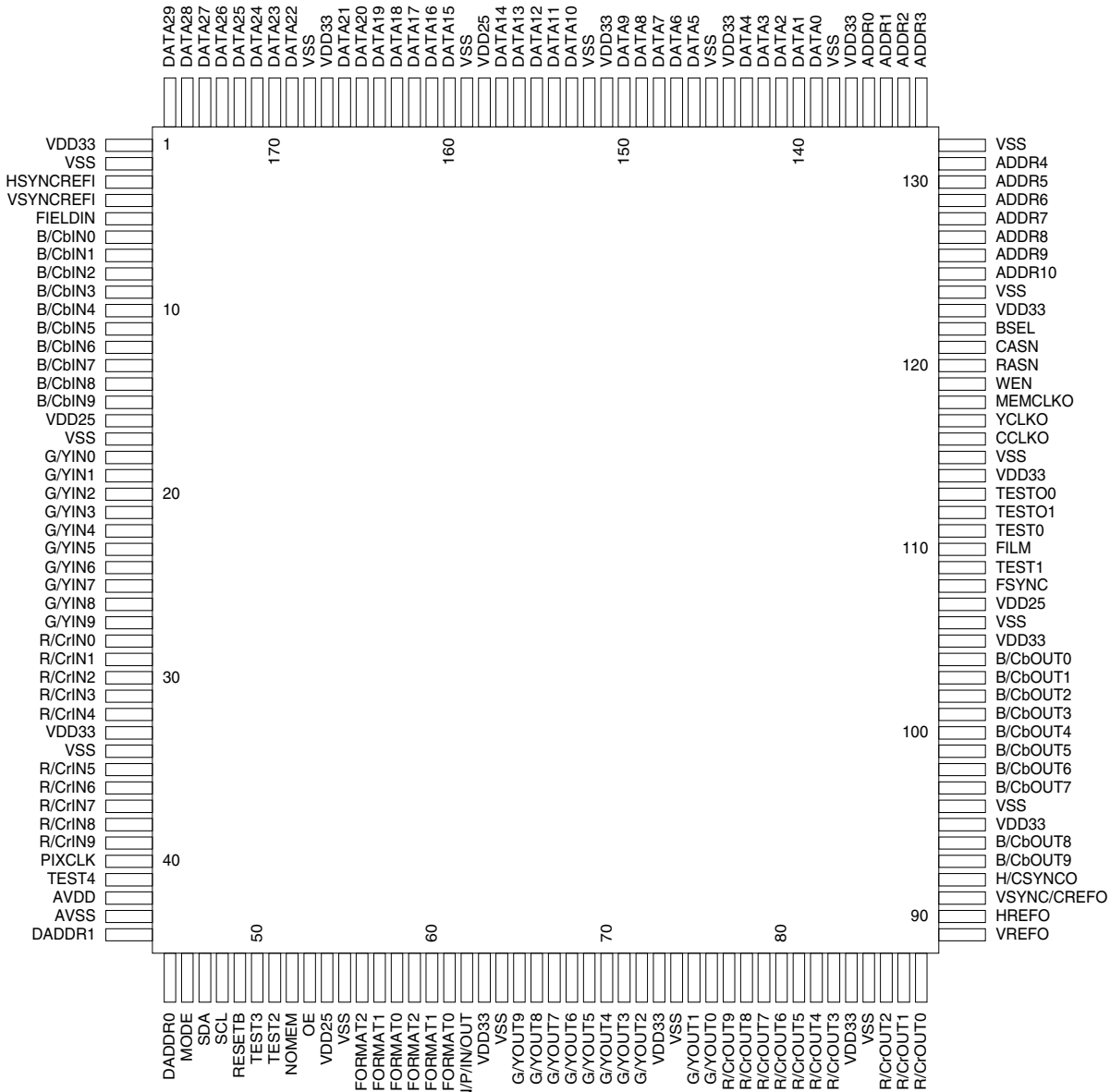
Features

- Motion-adaptive cross-color suppression removes artifacts produced by improper Y/C separation in low-cost video decoders
- Motion-adaptive video deinterlacing selects optimal filtering on a per-pixel basis
 - Film-mode for proper handling of 3:2 and 2:2 pulldown material
 - Bad-edit detection/correction compensates for poor scene cuts and insertions common in broadcast material
 - Motion-weighted interpolation for video sources produces maximum resolution without introducing motion artifacts
 - Directional Correlational Deinterlacing (DCDi™) minimizes jaggies on angled lines
- 8/10-bit Y/Cb/Cr (D1) (ITU-R BT 656), 16/20-bit Y Cb/Cr (ITU-R BT 601), 24/30-bit RGB or YCbCr/YPbPr interlaced input options
 - ? Supports 525/60 (NTSC), 625/50 (PAL/SECAM)
 - ? Accepts up to 1100 pixels/line
- 8/10-bit, 16/20-bit YUV, 24/30-bit RGB or YCbCr/YPbPr progressive output options
- Supports 8- or 10-bit inputs and outputs
- 10-bit internal processing for highest quality
- Includes color-space converters at input and output for maximum flexibility
- Auto-detection of NTSC/PAL/SECAM inputs
- High-order filtering produces smooth chroma output in 4:2:2 to 4:4:4 or 4:4:4 to 4:2:2 conversions
- Resolution recovery maximizes output signal-to-noise ratio and dynamic range
- Can be operated without glue logic with FLI2000 Video Decoder and FLI2220 Enhancer and OSD Generator ICs to produce highest quality video pipeline
- Glue-less interface to most standard video decoders
- Built-in display timing generator
- On-chip clock generator eliminates external PLLs
- On-chip SDRAM controller
- Uses low cost SDRAM as field memory – 4 MB
- Optimized intra-field operation allows memory-less configuration for lowest cost applications with same design and layout as for high-end applications
- 2-wire serial control interface for easy control
- 176-pin TQFP package

Simplified Block Diagram



Pin description



Pin #	Name	Description
52	NOMEM	No Memory Mode control input. This pin controls the operation of the FLI2200 as follows: When this pin is set low the device is used with external field memories and operates in the full set of deinterlacing modes, i.e., motion adaptive video deinterlacing and full frame film source deinterlacing using 3:2 pulldown detection (2:2 pulldown for 625/50 sources). When this pin is set high the FLI2200 is forced into the intra-field only deinterlacing mode, which requires no external memories, allowing the FLI2200 to be used in low-cost applications where the ultimate video quality is not a requirement. <i>To ensure proper startup of the SDRAMs this pin should be set high during the power-up sequence.</i> This can be overridden by the NMOvr bit, bit 1 in register 05 _H , allowing this function to be set or changed via the I ² C bus. Please refer to the description of register 05 _H for details.
27-18	G/YIN _{9,0}	10-bit green or luminance signal input bus. The mode is set by the IFORMAT _{2,0} pins. This can be overridden by the IFmtOvr bit, bit 3 in register 00 _H , allowing this function to be set or changed via the I ² C bus. Please refer to the description of register 00 _H for details. This signal is sampled on the rising edge of PIXCLK.
15-6	B/CbIN _{9,0}	10-bit blue or Cb chroma signal input bus. The mode is set by the IFORMAT _{2,0} pins. This can be overridden by the IFmtOvr bit, bit 3 in register 00 _H , allowing this function to be set or changed via the I ² C bus. Please refer to the description of register 00 _H for details. Bits 6, 4 and 3 in register 08 _H specify the busses used in the multiplexed modes. In all cases the signals are sampled on the rising edges of PIXCLK. In the Y Cb Cr and Y Pb Pr modes the Cb or Pb signal is sampled on alternate rising edges of PIXCLK in 4:2:2 mode. The frequency of PIXCLK will be 27 MHz in the multiplexed Y/Cb/Cr mode and 13.5 MHz in all other modes. These pins should be tied low when not used.
39-35 32-28	R/CrIN _{9,0}	10-bit red or Cr chroma signal input bus. The mode is set by the IFORMAT _{2,0} pins. This can be overridden by the IFmtOvr bit, bit 3 in register 00 _H , allowing this function to be set or changed via the I ² C bus. Please refer to the description of register 00 _H for details. Bits 6, 4 and 3 in register 08 _H specify the busses used in the multiplexed modes. In all cases the signals are sampled on the rising edges of PIXCLK. In the Y Cb Cr mode the Cr signal is sampled on alternate rising edges of PIXCLK in 4:2:2 mode. The frequency of PIXCLK will be 27 MHz in the multiplexed Y/Cb/Cr mode and 13.5 MHz in all other modes. These pins should be tied low when not used.
3	HSYNCREFI	Horizontal sync or reference. The horizontal sync or reference of the input signal should be connected to this pin. The function is programmed with bit 4 in register 00 _H . The polarity and position of the sync or reference pulse relative to the start of active video are both programmable within a small range. When the FLI2200 is used in the ITU-R BT 601/D1 input mode with embedded syncs (IFormat = 110) this input is not used and should be tied low; in this case all sync information will be derived from the signal.
4	VSYNCREFI	Vertical sync or reference. The vertical sync or reference of the input signal should be connected to this pin. The function is programmed with bit 4 in register 00 _H . The polarity and position of the sync or reference pulse relative to the start of active video are both programmable within a small range. When the FLI2200 is used in the ITU-R BT 601/D1 input mode with embedded syncs (IFormat = 110) this input is not used and should be tied low; in this case all sync information will be derived from the signal.
5	FLDIN	Field identifier input. The field identifier output of the source signal should be connected to this pin. A low setting signifies an even field and a high level signifies an odd field. When bit 4 in register 00 _H is set low, the input timing is based on HREF and VREF and this signal is required. When this bit is set high the input timing is based on HSYNC and VSYNC and this signal is generated internally and is not required. When bit 5 in register 06 is set high this signal is also used as the frame boundary identifier for 30 Hz film sources.

Pin Connections and Functions

Pin #	Name	Description
See list	V _{SS}	Ground connections. Connect to the digital ground plane. Pins: 2, 17, 34, 55, 64, 74, 85, 96, 106, 115, 124, 132, 138, 145, 152, 159, 168
See list	V _{DD33}	Pad Ring digital power connections. Connect to the digital 3.3 volt power supply and decouple to the digital ground plane. Pins: 1, 33, 63, 73, 84, 95, 105, 114, 123, 137, 144, 151, 167
See list	V _{DD25}	Core Logic digital power connections. Connect to the digital 2.5 volt power supply and decouple to the digital ground plane. Pins: 16, 54, 107, 158
43	AV _{SS}	Ground connection for the clock PLL circuits. Connect to the digital ground plane
42	AV _{DD}	Analog power connections for the clock PLL circuit. Connect to a separately decoupled 2.5 volt power supply and decouple directly to the AV _{SS} pin..
49	RESETB	Reset. When this input is set low it will reset all the internal registers to the default states. Refer to the section on the control registers for details of these states. The device must be reset after it is powered-up.
53	OE	When this pin is set high the outputs of the FLI2200 will be enabled; when it is set low the outputs will be set into a high-impedance state.
56-58	IFORMAT ₂₋₀	Input signal format control. The settings of these pins set the format of the input signal. This can be overridden by the IFmtOvr bit, bit 3 in register 00 _H , allowing this function to be set or changed via the I ² C bus. Please refer to the description of register 00 _H for details.
59-61	OFORMAT ₂₋₀	Output signal format control. The settings of these pins set the format of the output signal. This can be overridden by the OFmtOvr bit, bit 3 in register 07 _H , allowing this function to be set or changed via the I ² C bus. Please refer to the description of register 07 _H for details.
44-45	DADDR ₁₋₀	The settings of DADDR ₁₋₀ allow the device address of the control bus to be programmed to prevent conflict with the other devices connected to the bus. DADDR ₁₋₀ allow the device address to be set to any of the following values: C0/C1 _H , C2/C3 _H , E0/E1 _H , E2/E3 _H . Please refer to the section “Control Bus Operation and Protocol” for further information.
46	MODE	When this pin is set low the control bus will operate in the slave mode; allowing the device to be programmed from an external controller. When it is set high the FLI2200 will self-program from an external I ² C memory connected to the bus. Please refer to the “Control Bus Operation and Control Protocol” section for more details.
47	SDA	2-wire serial control bus data. Data can be written to the control registers via this pin when it is in the input mode and data can be read from the status registers when it is in the output mode. Refer to the section on the serial port for timing and format details and to the section on the registers for programming information.
48	SCL	2-wire serial control bus clock. When the control port operates in slave mode this pin will be an input and when it operates in the self programming mode it will be an output.
40	PIXCLK	Pixel clock input. This clock is used to drive all the circuits in the FLI2200. An internal PLL is used to upconvert this clock to provide the master clock signal and other clocks used internally. Note that when the FLI2200 is used in the D1 input mode the PIXCLK input should run at the rate of two cycles per pixel (one for luma and one for chroma).
62	N/P/IN/OUT	NTSC/PAL input or output. The default function of this pin is NTSC/PAL signal indicator output. When the input video signal is a 525 line signal this pin will be set high and when it is a 625 line signal the pin is set low. This function of this pin can be programmed to be an input according to the setting of this pin if the NPop ₁₋₀ bits, bits 5-4 in register 03 _H , are set to 00 _H , overriding the internal line counter. i.e., it will treat the signal as a 525 line signal when it is set high and a 625 line signal when it is set low.

Pin #	Name	Description
65-72 75-76	G/YOUT _{9,0}	Green or luminance output bus. In the RGB mode this output is the Green signal and in the YCbCr mode it is the Y signal. The mode is set by the OFORMAT _{2,0} pins. This can be overridden by the OFmtOvr bit, bit 3 in register 07 _H , allowing this function to be set or changed via the I ² C bus. Please refer to the description of register 07 _H for details. The signal is clocked out on the falling edge of YCLKO.
93-94 97-104	B/CbOUT _{9,0}	Blue or Cb chrominance output bus. In the RGB mode this output is the Blue signal, in the Y Cb Cr mode it is the Cb signal. The mode is set by the OFORMAT _{2,0} pins. This can be overridden by the OFmtOvr bit, bit 3 in register 07 _H , allowing this function to be set or changed via the I ² C bus. Please refer to the description of register 07 _H for details. The busses used in the multiplexed modes are set by means of bit 5 in register 08 _H . The signal is clocked out on the falling edge of YCLKO in the RGB and YUV 4:4:4 modes, on the falling edge of YCLKO prior to the next rising edge of CCLKO in the YUV 4:2:2 mode, and on the rising edge of MEMCLKO in the multiplexed YCbCr (pseudo D1) mode.
77-83 86-88	R/CrOUT _{9,0}	Red or Cr chrominance output bus. In the RGB mode this output is the Red signal, in the YCbCr mode it is the Cr signal. The mode is set by the OFORMAT _{2,0} pins. This can be overridden by the OFmtOvr bit, bit 3 in register 07 _H , allowing this function to be set or changed via the I ² C bus. Please refer to the description of register 07 _H for details. The busses used in the multiplexed modes are set by means of bit 5 in register 08 _H . The signal is clocked out on the falling edge of YCLKO in the RGB and YUV 4:4:4 modes, on the falling edge of YCLKO prior to the next rising edge of CCLKO in the YUV 4:2:2 mode, and on the rising edge of MEMCLKO in the multiplexed YCbCr (pseudo D1) mode.
116	CCLKO	Chroma output sampling clock. This clock is derived from PIXCLK and will be at half the frequency of YCLKO. In 30-bit 4:2:2 output mode the chroma output signals will change on the falling edge of YCLKO prior to the next rising edge this clock.
117	YCLKO	Luma output sampling clock. This clock is derived from PIXCLK and is double the frequency of PIXCLK. In 30-bit and 20-bit output modes the output signals will change on the falling edge of this clock.
89	VREFO	Start of active field or frame indicator. This signal goes high to indicate the first active line in each field or frame and goes low during the vertical blanking interval. The polarity and timing of this signal are programmable.
90	HREFO	Start of active line indicator output. This signal goes high to indicate the first active pixel in each line and goes low during the horizontal blanking interval. The polarity and timing of this signal are programmable.
91	VSYNCR/ CREFO	Vertical sync output. This signal provides the vertical sync function for the outputs. Its polarity is programmable to be active high or active low. It can also be programmed to be a composite reference for applications requiring this instead of sync.
92	H/CSYNCO	Horizontal or composite sync output. This signal provides the horizontal sync function for the outputs. Its polarity is programmable to be active high or active low. This signal can also be programmed to be the composite sync output, CSYNC.
108	FSYNC	Film mode sync output. When film mode is detected this pin will toggle in sync with the 3:2 (NTSC) or 2:2 (PAL and 30 Hz film in NTSC) pulldown sequence detected in the source.
110	FILM	Film mode detector output. This pin will be set high when the FLI2200 detects that the video input was converted from 24 fps film with a teleciné machine. If film mode is not detected this pin will be set low.

Pin #	Name	Description
125-131 133-136	ADDR ₁₀₋₀	SDRAM Address bus. This signal bus is used to address the external SDRAM(s) used for field memories. It should be connected to the A ₁₀₋₀ bus of the memory chip(s). Please refer to the Applications section of this data sheet for further details.
176-169 166-160 157-153 150-146 143-139	DATA ₂₉₋₀	SDRAM Data bus. This signal bus is used to transfer the data to and from the external SDRAM(s) used for field memories. It should be connected to the DQ ₂₉₋₀ bus of the memory chip when using a 64 Mbit SDRAM. When using two 16 Mbit SDRAMs this 30-bit bus may be connected to the two 16-bit data busses of the memories in two ways: either connect 16 lines to one chip and 14 to the other, or connect 15 to both. In all cases the two unused data lines on the memory chip(s) should be connected to ground via 22 k Ω resistors. Please refer to the Applications section of this data sheet for further details.
118	MEMCLKO	SDRAM clock and 2x output sampling clock. This clock is derived from PIXCLK and will be at double the frequency of YCLKO. This active signal should be connected to the CLK pin(s) on the SDRAM(s). When the 10-bit output mode selected the output signals will also change at this clock rate and this should then be used as the output clock..
119	WEN	SDRAM Write Enable. This active low signal should be connected to the WE pin(s) on the SDRAM(s).
120	RASN	SDRAM Row Address Select. This active low signal should be connected to the RAS pin(s) on the SDRAM(s).
121	CASN	SDRAM Column Address Select. This active low signal should be connected to the CAS pin(s) on the SDRAM(s).
122	BSEL	SDRAM Bank Select. When using two 16 Mbit SDRAMs this signal should be connected to the BA (also called BS or A ₁₁) pin on both SDRAMs. When using a 64 Mbit SDRAM this signal should be connected to the BA0 (also called BS0 or A ₁₁) pin on the SDRAM and BA1/BS1 (also called BA when BA0 is referred to as A ₁₁) should be tied low.
41, 50, 51, 109, 111	TEST ₄₋₀	These pins are used for test purposes only and should always be tied low for normal operation.
112, 113	TESTO ₁₋₀	These pins are test outputs and should be left unconnected in normal operation.

9.11 IC's Divio Board

9.11.1 IC7404: NW700



Features and Benefits

Enhanced Feature set

- Fully DV-SD Compliant
- Automatic Audio and AUX Code Processing
- Pin compatible with NW701 (DV CODEC)

Low System Cost

- Integrated single-chip design including AV processing and video decoding
- Glue-less interface to Video Encoder (SAA7121), Audio Encoder (UDA1340), Micro-controller, and memory
- Integrated shuffle memory logic
- Requires only one 256K x 32 EDO DRAM

Real-time Performance

- High speed (33Mbytes/s throughput)
- 54MHz double clock speed for dual stream applications

Video and Audio Support

- CCIR656 Video output and I²S Audio output
- Support NTSC and PAL
- Selectable Audio channel (A/B or C/D)
- 48, 44.1, and 32KHz (12- and 16-bit) audio support

Simple Host Bus connectivity

- 8 or 16-bit asynchronous host bus interface
- built-in 512 byte DV FIFO
- Three interrupt pins for enhanced system control

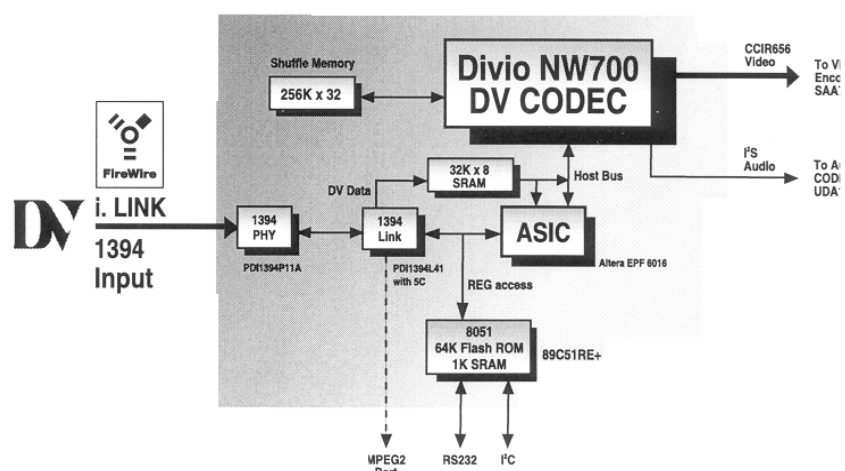
NW700 DV Decoder Daytona Beach Reference Solution

divio introduces the NW700, the world's first single-chip DV decoder. Fully DV-SD compliant and designed with divio's patented pending compression technology, the NW700 delivers unrivaled video quality, performance and compatibility. With a single-chip design and glueless interface to standard video components, divio's single chip DV decoder will replace current multi-chip solution and enable a new generation of cost-effective digital video consumer products.

divio has created the "Daytona Beach" reference solution that includes the NW700, Philips Semiconductor's PDI1394L4X audio/video 1394 LINK layer controller and PDI1394P11A 200 Mbits/sec PHY. divio provides a complete easy to integrate DV/IEEE1394 solution to OEMs to reduce time-to-market and development costs.

The NW700 provides an unprecedented feature-set that deliver real-time DV decoding functions to empower the next generation of consumer electronics devices.

DAYTONA BEACH DV Decode Module



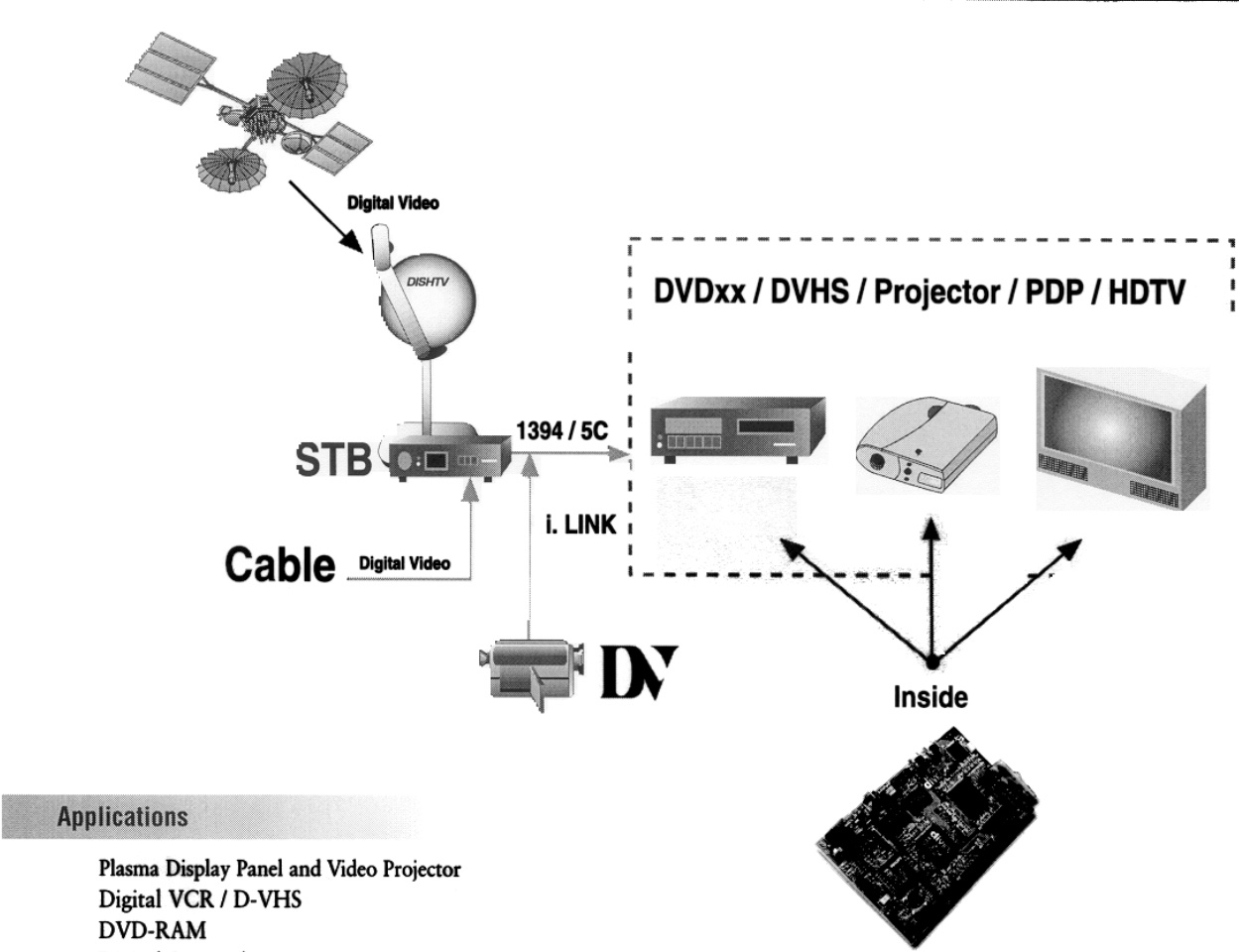
A P P L I C A T I O N S

NW700

DV Decoder

Daytona Beach

Reference Solution



Applications

- Plasma Display Panel and Video Projector
- Digital VCR / D-VHS
- DVD-RAM
- Digital Set-top-box
- HDTV

Daytona Beach Reference Kit

Board Components

- divio NW700 - DV Decoder
- 8051 μ C (P89C51RD2)
- 100p FPGA/32k x 8 SRAM
- IEEE1394 LINK (PDI1394L4X)
- IEEE1394 PHY (PDI1394P11A)
- 256 x 32 EDO Memory

Manufacturing Kit Contents

- Daytona Beach Reference Design
- Schematics, Gerber Files and BOM
- Technical Documents and Manuals
- FPGA and Firmware Source Code

Ordering Information

Part Number	Description
NW700LQ	DV Decoder
Daytona Beach	Manufacturing Kit

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9.12 List of Abbreviations

Digital Board

+12V
+12V Power Supply
+2V5_FLI
+2V5 Power Supply for FLI
+2V5_PLL
+2V5 Power Supply for PLL
+3V3
+3V3 Power Supply
+3V3_ANA
+3V3 Power Supply Analogue
+3V3_DD
+3V3 Power Supply Digital
+3V3_FLI
+3V3 Power Supply for FLI
+5V
+5V Power Supply
+5V_BUFFER
+5V Power Supply for Video Filters
5508_HS
Horizontal Synchronisation from Host Decoder to Progressive Scan
5508_ODD_EVEN
Odd - Even control from Host Decoder to Progressive Scan
-5V
-5V Power Supply
-5V_BUFFER
-5V Power Supply for Video Filters
A_EMPRESS(13:0)
EMPRESS address output to SDRAM
ACC_ACLK_OSC
Audio Clock PLL output sync with incoming video for record
ACC_ACLK_PLL
Audio Clock PLL output for play back
ACLK_EMP
EMPRESS audio clock output
AD_ACLK
Audio Decoder Clock
AD_BCLK
Audio Decoder I2S bit clock
AD_DATAO
Audio Decoder Output data (PCM)
AD_SPDIF33
Audio digital output to the analog board
AD_WCLK
Audio Decoder I2S word clock
AE_ACLK
Audio Encoder Clock
AE_ACLK_OEN
Audio Encoder Clock Output Enable
AE_BCLK
Audio Encoder I2S bit clock
AE_BCLK_DV
Audio Encoder I2S bit clock to DVIO
AE_BCLK_VSM
Audio Encoder I2S bit clock to VSM
AE_DATAI
Audio Encoder Input data (PCM)
AE_DATAI_DV
Audio Encoder Input data (PCM) from DVIO
AE_DATAO
Audio Encoder Output data (PCM)
AE_WCLK
Audio Encoder I2S word clock
AE_WCLK_DV
Audio Encoder I2S word clock to DVIO
AE_WCLK_VSM
Audio Encoder I2S word clock to VSM
ANA_WE
Analogue write enable
ANA_WE_LV

Analogue write enable Low Voltage
B_IN_VIP
Video blue input to Video Input Processor
B_OUT
Video blue output from Host Decoder
B_OUT_B
Filtered blue video output
BA
Bank Address
BCLK_CTL_SERVICE
Bitclock control Service Interface
BE_BCLK
Basic Engine I2S bit clock
BE_BCLK_VSM
Basic Engine I2S bit clock to VSM
BE_CPR
Basic Engine Control Processor ready to accept data
BE_DATA_RD
Basic Engine Data read
BE_DATA_WR
Basic Engine Data write
BE_FAN
Basic Engine FAN
BE_FLAG
Basic Engine error flag
BE_IRQN
Basic Engine interrupt request
BE_LOADN
Basic Engine LOAD(LOW active)
BE_RXD
Basic Engine S2B received data
BE_SUR
Basic Engine servo unit ready to accept data (S2B)
BE_SYNC
Basic Engine sector/abs time sync
BE_TXD
Basic Engine S2B transmitted data
BE_V4
Basic Engine versatile input pin
BE_WCLK
Basic Engine I2S word clock
C_IN
Video Chrominance input
C_IN_VIP
Chrominance input to Video Input Processor
C_OUT
Chrominance output from Host Decoder
C_OUT_B
Filtered Chrominance output
CAS
Column Address strobe
CB_OUT(9:0)
Chrominance Blue out
CLK4
SDRAM clock
CPUINT0
Control processor unit interrupt
CPUINT1
Control processor unit interrupt
CR_OUT(9:0)
Chrominance Red out
CTS1P
Clear to send (Service Interface)
CVBS_OUT
Composite video output out of the Host Decoder
CVBS_OUT_B
Filtered Composite video output
CVBS_OUT_B_VIP
Composite video output to Video Input Processor(digital board video loop)
CVBS_Y_IN
Composite video/Luminance input
CVBS_Y_IN_A
Composite video/Luminance input to Video Input Processor
CVBS_Y_IN_B

Composite video/Luminance input to Video Input Processor	HD_M_DQML
CVBS_Y_IN_C	Host Decoder SDRAM data mask enable(Lower)
Composite video/Luminance input to Video Input Processor	HD_M_DQMU
D_ADDR(10:0)	Host Decoder SDRAM data mask enable(Upper)
Address bus	HD_M_RASN
D_DATA(29:0)	Host Decoder SDRAM row address strobe
Data bus	HD_M_WEN
D_EMPRESS(15:0)	Host Decoder SDRAM write enable
SDRAM data input/output of EMPRESS	HSOUT
D_PAR_D(7:0)	Horizontal synchronisation OUT
Front-end parallel interface data (record)	ION
D_PAR_DVALID	Inverted ON: Enable the power supply for the digital board when LOW
Front-end parallel interface data valid	IRESET_DIG
D_PAR_REQ	Initialisation of the digital board, HIGH when power ON
Front-end parallel interface request	JTAG3_TCK
D_PAR_STR	JTAG Test Clock
Front-end parallel interface strobe	JTAG3_TD_VIP_TO_VE
D_PAR_SYNC	JTAG Transmitted Data Video Input Processor to Video Encoder
Front-end parallel interface sync	JTAG3_TD_VSM_TO_VIP
DV_IN_CLK	JTAG Transmitted Data Versatile Stream Manager to Video Input Processor
Digital Video in clock from DVIO board	JTAG3_TMS
DV_IN_DATA(7:0)	JTAG Test Mode Select
Digital Video in data bus from DVIO board	JTAG3_TRSTN
DV_IN_HS	JTAG Test part ResetN
Digital Video in horizontal synchronisation from DVIO board	LOAD_DVN
DV_IN_VS	LOAD Digital Video(LOW active)
Digital Video in vertical synchronisation from DVIO board	MUTEN
EMI_A(21:1)	Mute enable
External Memory Interface Address Bus(Host Decoder)	MUTEN_LV
EMI_BE0N	Mute enable Low Voltage
External Memory Interface Lower byte enable(Host Decoder)	P_SCAN_YUV(7:0)
EMI_BE1N	Progressive Scan digital video bus
External Memory Interface Upper byte enable(Host Decoder)	R_IN_VIP
EMI_CAS0N	Video Red input to Video Input Processor
External Memory Interface SDRAM column address strobe(Host Decoder)	R_OUT
EMI_CE1N	Video Red output from Host Decoder
External Memory Interface VSM Lower bank enable	R_OUT_B
EMI_CE2N	Filtered Red Video output from Host Decoder
External Memory Interface VSM Higher bank enable	RAS
EMI_CE3N	Row Address Strobe
External Memory Interface flash IC's enable	RESETN
EMI_D(15:0)	Reset Host Decoder
External Memory Interface Data Bus(Host Decoder)	RESETN_BE
EMI_PROCCLK	System reset basic engine (buffered)
External Memory Interface Processor Clock(Host Decoder)	RESETN_DVIO
EMI_RWN	System reset Digital Video Input Output (buffered)
External Memory Interface Read/Write control signal(Host Decoder)	RESETN_VE
EMI_WAIT	System reset Video Encoder
External Memory Interface Wait state request(Host Decoder)	ROMH_CEN
EMPRESS_BOOT	Flash 2 chip enable
EMPRESS BOOT select input	ROML_CEN
EMPRESS_IRQN	Flash 1 chip enable
EMPRESS Interrupt request output	RSTN_BE
FLASH_OEN	Reset control of basic engine
FLASH output enable control signal	RSTN_DVIO
G_IN_VIP	Reset control of DVIO
Video green input to Video Input Processor	RTS1P
G_OUT	Ready To Send data to service serial interface
Video green output from Host Decoder	RX1P
G_OUT_B	Receive data from service serial interface
Filtered green video output from Host Decoder	SCL
GNDD	I2C bus clock
Digital Ground	SD_CASN
HD_M_AD(13:0)	SDRAM Column Address strobe output (active LOW)
Host Decoder SDRAM address bus	SD_CLK
HD_M_CASN	SDRAM clock output
Host Decoder SDRAM column address strobe	SD_CLKE
HD_M_CLK	SDRAM clock enable output
Host Decoder SDRAM clock	SD_CSN
HD_M_CS0N	SDRAM
Host Decoder SDRAM chip select	SD_DQM(1:0)
HD_M_DQ(15:0)	SDRAM data mask enable output
Host Decoder SDRAM data bus	

SD_RASN	Power supply for analog input of VIP
SDRAM row address strobe output	VDDA2A_7118
SD_WEN	Power supply for analog input of VIP
SDRAM write enable output	VDDA3A_7118
SDA	Power supply for analog input of VIP
I2C bus data	VDDA4A_7118
SEL_ACLK1	Power supply for analog input of VIP
Select audio clock(playback)	VDDE_7118
SM_CS3N	Power supply digital for peripheral cells of VIP
SRAM chip select	VDDI_7118
SM_LBN	Power supply digital for core of VIP
SRAM lower bank	VDDX_7118
SM_OEN	Power supply for crystal oscillator of VIP
SRAM output enable	VE_DATA(7:0)
SM_UBN	Video Encoder data Bus
SRAM upper bank	VE_DSN
SM_WEN	Video Encoder Data Strobe
SRAM write enable	VE_DTACKN
SMA(17:0)	Video Encoder Data Transfer acknowledge
SRAM address output	VIP_ERROR
SMD(15:0)	Video Input Processor error
SRAM data input/output	VIP_FB
SYSCLK_EMPRESS	Video Input Processor Fast Blanking
System clock EMPRESS	VIP_FID_FF
SYSCLK_PROGSCAN	Video Input Processor field identifier to Flip Flop
System clock Progressive Scan	VIP_HS
SYSCLK_VSM_5508	Video Input Processor horizontal synchronisation
System clock VSM and Host decoder	VIP_ICLK
TX1P	Video Input Processor input Clock
Transmit data to service serial interface	VIP_IDQ
U_IN	Video Input Processor output data qualifier
Video U input	VIP_IGP1
U_IN_VIP	Video Input Processor input general purpose 1
Video U input to Video Input Processor	VIP_INT
V_IN	Video Input Processor interrupt
Video V input	VIP_RTS1
V_IN_VIP	Video Input Processor ready to send
Video V input to Video Input Processor	VIP_VS
VCC3_CLK_BUF	Video Input Processor vertical synchronisation
Power supply 3V3 clock buffer	VIP_YUV(7:0)
VCC3_VSM	Video Input Processor digital video(CCIR 656)
Power supply 3V3 Versatile Stream Manager	VS_IN
VCC3_VSM_MEM	Vertical synchronisation IN
Power supply 3V3 Versatile Stream Manager Memory	VSM_M_A(13:0)
VCC5_4046	Versatile Stream Manager SDRAM address bus
Power supply 5V to PLL IC	VSM_M_CASN
VDD_125	Versatile Stream Manager SDRAM column address strobe
Power supply 5V to buffer 7202	VSM_M_CLKEN
VDD_CORE	Versatile Stream Manager SDRAM clock enable
Sti5508 Core supply voltage 2.5V	VSM_M_CLKOUT
VDD_EMP	Versatile Stream Manager SDRAM clock out
Empress supply voltage 3.3V	VSM_M_D(15:0)
VDD_EMP_CORE	Versatile Stream Manager SDRAM data bus
Empress Core supply voltage 2.5V	VSM_M_LDQM
VDD_FLASH_H	Versatile Stream Manager SDRAM lower data mask enable
Flash 7301 supply voltage	VSM_M_RASN
VDD_FLASH_L	Versatile Stream Manager SDRAM row address strobe
Flash 7302 supply voltage	VSM_M_UDQM
VDD_LVC32	Versatile Stream Manager SDRAM upper data mask enable
Power supply LVC32	VSM_M_WEN
VDD_PCM	Versatile Stream Manager SDRAM write enable
Power supply Audio decoder of Sti5508	VSM_UART1_CTSN
VDD_PLL	Versatile Stream Manager UART1 clear to send to analog board (UART1 is gateway to analog board)
Power supply PLL audio decoder of Sti5508	VSM_UART1_RTSN
VDD_RGB	Versatile Stream Manager UART2 clear to send to DVIO board (UART2 is gateway to DIVIO board)
Power supply video encoder of Sti5508	VSM_UART1_RX
VDD_STI	Versatile Stream Manager UART1 ready to send to analog board
Power supply of Sti5508	VSM_UART1_TX
VDD_YCC	Versatile Stream Manager UART2 ready to send to DVIO board
Power supply video encoder of Sti5508	VSM_UART2_CTSN
VDD5_MK2703	
Power supply MK2703	
VDD5_OSC	
Power supply Oscillator	
VDDA1A_7118	

Buffer Enable Audio
 BUFENN_VID
 Buffer Enable Video
 CCLK
 Configuration Clock
 CLK27M
 27MHz Clock
 CLK27M_CON
 27MHz Clock to Digital Board
 CLK27M_DV
 27MHz Clock Digital Video Codec
 CLK27M_OSC
 27MHz Clock IC7304
 CLOCKGENAUD
 Clock generator Audio
 CLOCKGENVID
 Clock generator Video
 CTSN
 Clear to Send
 DATA
 Data from config ROM
 DONE
 Indication of the completion of the configuration process
 DOUT
 Serial configuration data output
 DV_ASN
 DVCODEC Address Strobe
 DV_DRQN
 DVCODEC Data Request Interrupt
 DV_DSLN
 DVCODEC Data Strobe Lower 8 bits
 DV_DSUN
 DVCODEC Data Strobe Upper 8 Bits
 DV_DTACKN
 DVCODEC Data Transfer Acknowledge
 DV_ERRN
 DVCODEC Error Interrupt
 DV_HS_IN
 DVCODEC Horizontal synchronisation In
 DV_HS_OUT
 DVCODEC Horizontal synchronisation Out
 DV_LCN
 DVCODEC Last Code Interrupt
 DV_PDN
 DVCODEC Power Down
 DV_RSTN
 DVCODEC System Reset for NW701
 DV_RWN
 DVCODEC Read/Write control signal
 DV_VS
 DVCODEC Vertical synchronisation
 FIFOA_A(0:15)
 FIFO buffer A Address bus
 FIFOA_OEN
 FIFO buffer A Output enable
 FIFOA_WEN
 FIFO buffer A Write enable
 HAD(0:7)
 Host Address/Data bus for register settings of IC7404
 INITN
 Initiate Configuration
 IO(0:30)
 Data bus of IC7404
 ISPN
 In System Program Line (used for programming IC7203)
 LCASN
 Lower Column Address strobe for IC7404 DRAMS
 LINK_AVCLK
 LINK IC Audio/Video Interface Clock
 LINK_AVFSYNC
 LINK IC Audio/Video frame sync
 LINK_AVREADY
 LINK IC Audio/Video data ready to send
 LINK_AVSYNC
 LINK IC Audio/Video packet sync

LINK_AVVALID
LINK IC Audio/Video data valid
LINK_CSN
LINK IC chip select
LINK_INTN
LINK IC interrupt
LINKFIFO_DQ(0:7)
Audio Video data interface
PA(0:15)
SRAM processor address
PAD(0:7)
SRAM processor data
PALE
Processor Address Latch Enable
PHY_CNA
PHY 1394 cable not active
PHY_LPS
LINK IC power status
PINT0N
Processor interrupt 0
PINT1N
Processor interrupt 1
PRDN
Processor read
PROGRAMN
Low active input to initiate a configuration cycle
PRSTN
Processor reset
PWRN
Processor write
RASN
Row address strobe
RESETN
DVIO board reset
RTSN
System Reset
RXD
Receive Data
SRAMCE0N
SRAM processor chip enable 0
SRAMRDN
SRAM processor output enable
TCK
Boundary scan Test Clock
TDI
Boundary scan Test Data Input
TDO
Boundary scan Test Data Output
TDO_CONF
Boundary scan Test Data Output from IC 7309
TMS
Boundary scan Test Mode Select
TXD
Transmitted Data
UCASN
Upper column address strobe
WEN
Write Enable control signal to SRAM
YUV(0:7)
Digital Video









Analog Board

+5VSTBY
Permanent Supply 5V
8SC2
Pin8 Scart2 (only for Europe)
A_DATA
Data from Analog- to Digital-Board (UART-Communication)
A_RDY
Analog-board ready (status information to digital-board)
A18 - A19
Parallel Address Bus (CC - Flash-ROM and S-RAM)
A8 - A17
Parallel Address Bus (CC - Flash-ROM and S-RAM)

AD0 - AD7
Parallel Address and Data Bus (CC - Flash-ROM and S-RAM)
AFC
Automatic Frequency Control
AFEL
Audio Frontend Left
AFER
Audio Frontend Right
AGC / WSRI
Automatic Gain Control (for Europe), Wide Screen Rear In (for NTSC)
AINFL
Audio In Front Left
AINFR
Audio In Front Right
AKILL
Audio Kill Signal
ALADC
Audio Left to ADC
ALDAC
Audio Left from DAC
ALE
Address Latch Enable
AM0
Adress-mode 0
AM1
Adress-mode 1
ARADC
Audio Right to ADC
ARDAC
Audio Right from DAC
ASCC1M
Audio Scart 1 Mute (System Clock Output for Real time Clock-Adjustment)
AVCC
Power Supply for A/D-converter
AVSS
GND-Pin for A/D-converter
CFIN
Chroma Front In
CS0_
Chip Select 0 (CC - S-RAM)
CS2_
Chip Select 2 (CC - Flash-ROM)
CVBSFIN
Video Front In
D_DATA
Data from Digital- to Analog-Board (UART-Communication)
D_RDY
Digital-board ready (status information from digital-board)
DAC_MUTE
Mute Signal for DAC
DAOUT
Digital Audio Out
DVAL
Audio from Digital Video In Left
DVAR
Audio from Digital Video In Right
DVCC1
Power Supply Pin
DVCC2
Power Supply Pin
DVCC3
Power Supply Pin
DVSS1
GND Pin
DVSS2
GND Pin
DVSS3
GND Pin
FAN_OFF
Fan for Basic engine
FBIN
Fast Blanking input
FOME

Follow ME Status line (matching signals yes/no; only for Europe)	Pin for Reference-voltage input to A/D-converter
G1...10	VREFL
DISPLAY GRID	Pin for Reference-voltage input to A/D-converter
INT	VS1/2
Interrupt OUT for the CC	View Selector 1/2
INT	WR_
Interrupt – line from Display Print	Write Enable (CC - Flash-ROM and S-RAM)
ION	WSFI
Inverse ON-Line	Wide Screen Signalling Front In
IPFAIL	WU
Inverse Power Fail Detection	Wake Up
IPOR	X1
Inverse Power On Reset	Oscillator Pin
IRESET	X2
Inverse Reset Input	Oscillator Pin
IRR	XIN
Signal from IR-Receiver	Oscillator Pin
K1	XOUT
Key-Input-Line	Oscillator Pin
K2	XT1
Key-Input-Line	Low Frequency Oscillator Pin
KILL	XT2
Audio Mute	Low Frequency Oscillator Pin
P50 IN	YFIN
P50 INput-line (only for Europe)	Luminance Front In
P50 OUT	
P50 OUTput-line (only for Europe)	
POR_DC	
Power On Reset for Display Control Print (Ext_DL)	
PSS	
Pal/Secam-Select	
PWM_FIL	
Control line for Filament Voltage Generation	
PWONSW	
Amplifier Switch Audio A/D Converter	
RD_	
Output Enable ReaD (CC - Flash-ROM and S-RAM)	
RECLED	
Control Signal for REC-LED	
RESET_DIG	
Reset Line to Digital Board	
RP_	
Inverse Reset line to Flash-ROM	
RSA1/2	
Record Selector 1/2	
RY/BY_	
Ready/Busy – input line (from Flash-ROM)	
SIF1	
Sound intermediate frequency	
SB1	
Secam Band 1 (PCB-Test entrance)	
SCL	
I²C-Bus	
SCLSW	
Switched I²C-Bus	
SDA	
I²C-Bus	
SDASW	
Switched I²C-Bus	
SFS_TS	
SAW Filter Select Trap Select	
STBY	
Standby-Line (Flash_Toshiba)	
SYNC	
Video Sync input	
TEMP_SENSE	
Temperature Sense Line	
VER	
HW-version input	
VFV	
Video from Frontend	
VKK	
VFT Driver Power Supply	
VREFH	

10. Spare Parts List

Mechanical Parts			Display Board					
0001	3103 607 90062	CONTROL PANEL ASSY EU DVIO, DVDR890	Various			7100	2722 171 07729	VFD 10-BT-242GNK (FTB0)B
0001	3103 607 90071	CONTROL PANEL ASSY EU, DVDR880	1111	4822 242 82114	EFOEC8004/T4	7101	3198 010 42310	BC847BW
0001	3103 607 90101	CONTROL PANEL ASSY UK, DVDR880/05x	1160	4822 276 13732	SWITCH TACT PUSH	7102	3198 010 42310	BC847BW
0001	3103 607 90112	CONTROL PANEL ASSY UK DVIO, DVDR890/05x	1161	4822 276 13732	SWITCH TACT PUSH	7103	4822 130 40981	BC337-25
0010	3103 607 50101	KEY-SET RIGHT ASSY	1162	4822 276 13732	SWITCH TACT PUSH	7104	4822 130 41246	BC327-25
0011	3103 607 50131	KEY-SET LEFT ASSY	1163	4822 276 13732	SWITCH TACT PUSH	7105	3198 010 42310	BC847BW
0012	3103 607 50161	KEY REC ASSY	1164	4822 276 13732	SWITCH TACT PUSH	7106	3198 010 42310	BC847BW
0021	3103 607 50181	DISPLAY-DECOR-WINDOW ASSY	1165	4822 276 13732	SWITCH TACT PUSH	7110	3103 165 13731	TMP87C874F/LDCP1
0026	3103 607 50191	FLAP ASSY , DVDR880	1166	4822 276 13732	SWITCH TACT PUSH	7150	9322 155 82667	IR RECEIVER TSOP2236
0026	3103 607 50271	FLAP ASSY DVIO, DVDR890	1170	4822 276 13732	SWITCH TACT PUSH	7180	4822 130 60854	DTA124EU-W
0070	3103 607 90081	TRAY FRONT ASSY	1171	4822 276 13732	SWITCH TACT PUSH	Front AV Board		
0105	3103 607 50251	FOOT ASSY	1180	4822 276 13732	SWITCH TACT PUSH	Various		
0300	3103 607 50231	COVER ASSY	1916	4822 267 11031	10P. FEM. V	1910	2422 026 05301	SOC CINCH V 3P FJJP1127 B
Miscellaneous Parts						1911	2422 025 10185	CON BM H 9P M 2.00 PH B
0350	3128 147 14021	REMOTE CONTROL 25110/01	2100	3198 017 34730	0603 16V 47nF COL	1912	2422 026 05307	CON MDIN H 4P F YKF51 B
0351▲	2422 070 98133	MAINSCORD EURO	2101	4822 124 81151	22µF 50V			
0351▲	4822 321 10713	MAINSCORD UK	2102	4822 121 51252	470nF 5% 63V	2202	4822 126 14241	0603 50V 330P COL R
0352	3103 601 00111	SCART CABLE EU	2103	4822 124 21732	10µF 20% 25V	2205	4822 126 14241	0603 50V 330P COL R
0355	3103 308 92610	CABLE AUDIO 2X2RCA MALE 1.5MTR	2104	3198 017 34730	0603 16V 47nF COL	2206	2238 586 59812	0603 50V 100NP80M
0356	4822 321 61579	VIDEO-CABLE	2105	5322 126 11578	1nF 10% 50V 0603			
0357	4822 320 50377	CONNECT. CABLE PAL	2106	4822 126 13879	220nF 20% 16V	3201	4822 051 30102	1k 5% 0.062W
0365	9307 002 60006	DVDRW/006 PHILIPS DISC EUROPE	2111	3198 017 34730	0603 16V 47nF COL	3202	4822 051 30105	1M 5% 0.062W
0380	3103 605 20011	DIR. FOR USE DVDR 880/001	2112	4822 124 11946	22µF 20% 16V	3206	4822 051 30102	1k 5% 0.062W
0380	3103 605 20031	DIR. FOR USE DVDR 880/021	2119	2238 586 59812	0603 50V 100NP80M	3207	4822 051 30105	1M 5% 0.062W
0380	3103 605 20051	DIR. FOR USE DVDR 880/051	2150	4822 124 11946	22µF 20% 16V	3210	4822 116 83868	150Ω 5% 0.5W
0380	3103 605 20061	DIR. FOR USE DVDR 890/001	2168	5322 126 11583	10nF 10% 50V 0603	3211	4822 051 30759	75Ω 5% 0.062W
0380	3103 605 20101	DIR. FOR USE DVDR 890/051	2169	5322 126 11583	10nF 10% 50V 0603	3212	4822 051 30759	75Ω 5% 0.062W
0381	3103 605 20021	DIR. FOR USE DVDR 880/001				3213	4822 051 30759	75Ω 5% 0.062W
0381	3103 605 20041	DIR. FOR USE DVDR 880/021	3100	4822 051 30103	10k 5% 0.062W			
0381	3103 605 20071	DIR. FOR USE DVDR 890/001	3101	4822 116 52304	82k 5% 0.5W	6200	9322 146 61685	DIO REG SM DF3A6.8FU TOSJ
0381	3103 605 20091	DIR. FOR USE DVDR 890/021	3102	4822 116 52304	82k 5% 0.5W	6201	9322 146 61685	DIO REG SM DF3A6.8FU TOSJ
1001▲	3103 608 50180	ANALOGUE/ POWER BOARD EURO	3103	4822 051 30471	470Ω 5% 0.062W	6202	9322 146 61685	DIO REG SM DF3A6.8FU TOSJ
1001▲	3103 608 50240	ANALOGUE/ POWER BOARD UK	3104	4822 051 30471	470Ω 5% 0.062W	6203	9322 146 61685	DIO REG SM DF3A6.8FU TOSJ
1002	3104 128 08440	PCB ASSY DIG BOARD 1.5 EU	3105	4822 051 30331	330Ω 5% 0.062W	6204	9322 146 61685	DIO REG SM DF3A6.8FU TOSJ
1003▲	3104 128 08500	PCB ASSY DVIO 4323	3106	4822 051 30331	330Ω 5% 0.062W	Analog Board		
1004▲	3103 608 50170	DISPLAY BOARD	3107	4822 051 30103	10k 5% 0.062W	Various		
1005	3103 608 50320	FRONT CONNECTOR BOARD	3108	4822 051 30102	1k 5% 0.062W	1001▲	2422 086 10919	PROT DEV 65V 125MA MP13
1006	3104 128 07610	PCB ASSY 4319 DVIO-FRONT	3109	4822 116 52283	4k7 5% 0.5W	1302▲	4822 252 11215	DSP301N-A21F
1007		BASIC ENGINE VAE8020	3110	4822 050 11002	1k 1% 0.4W	1303▲	4822 071 51002	19372(1A)
Cables			3111	4822 051 30471	470Ω 5% 0.062W	1304▲	2422 086 10786	FUSE,RADIAL4AMP,
8001	3103 601 00012	FFC FOIL 22P/90/22P BD FO	3113	4822 116 83884	47k 5% 0.5W	1306▲	2422 086 10919	PROT DEV 65V 125MA MP13
8003	3103 601 00032	FFC FOIL 10P/100/10P AD	3120	4822 050 21003	10k 1% 0.6W	1307▲	2422 086 10954	PROT DEV 65V 1A PSC
8004	3103 601 00042	CBLE KR 4P/205/4P KR SHI.	3121	4822 051 30101	100Ω 5% 0.062W	1308▲	2422 086 10951	PROT DEV 65V 500MA PSC
8005	3103 601 00052	FFC FOIL 22P/200/22P BD	3122	4822 116 52175	100Ω 5% 0.5W	1309▲	4822 071 58001	FUSE 800MA PSC
8006	3103 601 00062	CBLE KR 12P/115/12P KR UL	3123	4822 116 52175	100Ω 5% 0.5W	1600	4822 242 10434	L1101-95263-0E1(18,432MHz)
8007	3103 601 00072	FFC FOIL 10P/647/10P BD UL	3127	4822 050 11002	1k 1% 0.4W	1701	4822 242 81436	OFWK3953M
8008	3104 157 11790	CWAS SPLIT FLEX 30 100 32S	3128	4822 116 52257	22k 5% 0.5W	1702	2422 549 44341	FIL SAW 38MHz 9 OFWK9656M
8009	3103 601 00082	CBLE KR 8P/110/8P KR UL	3150	4822 116 83872	220Ω 5% 0.5W	1703	4822 242 10307	OFWG3956M
8010	3103 601 00132	CBLE KR 9P/715/9P KR SHIELDED	3151	4822 051 30102	1k 5% 0.062W	1703	4822 242 81436	OFWK3953M
8011	3104 128 92921	CABLE IEEE-1394 4P AMP	3160	4822 051 30103	10k 5% 0.062W	1704	2422 549 44611	FIL CER 5MHz 5 TPSR*MBQ2 BS A
			3161	4822 051 30221	220Ω 5% 0.062W	1705	3139 147 17001	TUNER UV1316MK3
			3162	4822 051 30103	10k 5% 0.062W	1706	4822 242 81572	TPS6,0MB-TF21
			3163	4822 051 30221	220Ω 5% 0.062W	1900	4822 265 11154	52030-2210 (22P)
			3168	4822 051 30222	2k2 5% 0.062W	1931▲	2422 030 00304	SOC SUPP AC HOR MALE 9452 B
			3169	4822 051 30222	2k2 5% 0.062W	1932	2422 025 10772	CON BM V 12P M 2.00 PH B
			3170	4822 116 52283	4k7 5% 0.5W	1933	4822 265 11352	CONN. 8P
			3171	4822 051 30102	1k 5% 0.062W			
			3172	4822 117 12063	NTC DC 5W 10k 5%			
			3180	4822 117 12925	47k 1% 0.063W 0603			
			3181	4822 051 30221	220Ω 5% 0.062W			
			3182	4822 051 30221	220Ω 5% 0.062W			
			3194	4822 117 12917	1Ω 5% 0.062W CASE0603			
								
			5110	4822 157 11706	10µH 5% 2.4X3.4			
			5191	2422 549 44607	IND FXD SM EMI100mH z 600RR			
			5192	2422 549 44607	IND FXD SM EMI100mH z 600RR			
			5193	4822 157 50964	100µH			
								
			6100	4822 130 10852	BZX284-C6V8			
			6180	4822 130 83092	TLHR4205			

1940	2422 033 00334	CON BM EURO H 42P F BK GRND-L
1942	2422 025 10769	CON BMT 9P VERT PH-B
1943	4822 267 11031	10P. FEM. V
1945▲	3103 608 50330	UP SUB PCB EURO
1947	4822 265 11154	52030-2210 (22P)
1948	4822 267 10994	4P, MDIN
1949	2422 026 05308	SOC CINCH H 3P F YEWHRD Y
1951	4822 267 31729	CON BM CINCH H1P F BK B
1960	2422 025 09406	CON BM 4P VERT PH-B
1990	4822 242 73552	13,875 000 MHz

-II-

2001	4822 124 80483	47μF 20% 6.3V
2002	2238 586 59812	0603 50V 100NP80M
2003	2238 586 59812	0603 50V 100NP80M
2004	4822 124 80483	47μF 20% 6.3V
2005	4822 124 42234	100μF 20% 6.3V
2006	4822 126 11785	0603 50V 47P PM5
2007	4822 124 21732	10μF 20% 25V
2008	3198 016 31020	0603 25V 1nF
2009	2238 586 59812	0603 50V 100NP80M
2010	4822 124 80483	47μF 20% 6.3V
2011	4822 124 21732	10μF 20% 25V
2012	2238 586 59812	0603 50V 100NP80M
2013	4822 124 42234	100μF 20% 6.3V
2014	2238 586 59812	0603 50V 100NP80M
2015	2238 586 59812	0603 50V 100NP80M
2018	2238 586 59812	0603 50V 100NP80M
2019	2238 586 59812	0603 50V 100NP80M
2020	4822 124 80483	47μF 20% 6.3V
2023	4822 124 80483	47μF 20% 6.3V
2024	4822 126 14225	56pF 5% 50V 0603
2025	3198 016 31020	0603 25V 1nF
2026	4822 126 14225	56pF 5% 50V 0603
2029	4822 124 80483	47μF 20% 6.3V
2031	4822 124 22652	2.2μF 20% 50V
2032	5322 126 11583	10nF 10% 50V 0603
2033	4822 126 13881	470pF 5% 50V
2034	4822 126 13881	470pF 5% 50V
2037	4822 126 13193	4.7nF 10% 63V
2038	4822 126 13193	4.7nF 10% 63V
2039	4822 126 13193	4.7nF 10% 63V
2040	4822 126 13193	4.7nF 10% 63V
2301▲	4822 126 14088	2.2nF 20% 250V
2302▲	4822 121 10512	275V 220nF 20%
2303	4822 122 31175	1nF 10% 500V
2304	4822 126 10206	2.2nF 10% 500V
2305	4822 124 40849	330μF 20% 16V
2306	4822 124 40184	1000μF 20% 10V
2307	4822 122 31175	1nF 10% 500V
2308	4822 121 70386	47nF 10% 250V
2309▲	2222 151 90053	EL 151 400V S 68μF PM20
2310	5322 126 11578	1nF 10% 50V 0603
2311	5322 126 11578	1nF 10% 50V 0603
2312	2020 021 91506	EL ZL 16V S 1000μF PM20 B
2313	4822 124 40184	1000μF 20% 10V
2315▲	4822 126 14525	47pF 5% 1KV
2317	5322 126 11578	1nF 10% 50V 0603
2318	4822 126 10206	2.2nF 10% 500V
2319	4822 124 40849	330μF 20% 16V
2320	4822 124 80791	470μF 16V 20% 105C DXH-8X11.5
2321	2238 586 59812	0603 50V 100NP80M
2322	4822 124 41584	100μF 20% 10V
2323	4822 124 42234	100μF 20% 6.3V
2324	2238 586 59812	0603 50V 100NP80M
2325	4822 124 81151	22μF 50V
2326	4822 121 41857	10nF 5% 250V
2327	2238 586 59812	0603 50V 100NP80M
2328	4822 124 81151	22μF 50V
2329	2238 586 59812	0603 50V 100NP80M
2330	5322 126 11578	1nF 10% 50V 0603
2331	2238 586 59812	0603 50V 100NP80M
2332	4822 124 22651	1.0μF 20% 50V
2334	2238 586 59812	0603 50V 100NP80M
2335	4822 124 21732	10μF 20% 25V
2336	2238 586 59812	0603 50V 100NP80M
2337	4822 122 33741	10pF 10% 50V
2338	2238 586 59812	0603 50V 100NP80M
2339	3198 017 41050	0603 10V 1μF COL R
2340	2020 554 90148	CERSAF NSA 250V S 470P PM20
2341	3198 017 41050	0603 10V 1μF COL R
2342	3198 017 41050	0603 10V 1μF COL R
2402	2238 586 59812	0603 50V 100NP80M
2403	4822 124 80483	47μF 20% 6.3V
2404	2238 586 59812	0603 50V 100NP80M
2405	4822 124 80483	47μF 20% 6.3V
2406	5322 126 11583	10nF 10% 50V 0603
2407	4822 122 33741	10pF 10% 50V

2408	3198 017 41050	0603 10V 1μF COL R
2409	2238 586 59812	0603 50V 100NP80M
2410	3198 017 41050	0603 10V 1μF COL R
2411	2238 586 59812	0603 50V 100NP80M
2412	4822 122 33741	10pF 10% 50V
2413	4822 124 80483	47μF 20% 6.3V
2414	2238 586 59812	0603 50V 100NP80M
2416	3198 017 41050	0603 10V 1μF COL R
2417	4822 124 11947	10μF 20% 16V
2418	3198 017 41050	0603 10V 1μF COL R
2419	3198 017 41050	0603 10V 1μF COL R
2420	2238 586 59812	0603 50V 100NP80M
2421	4822 124 11947	10μF 20% 16V
2422	5322 126 11583	10nF 10% 50V 0603
2423	3198 017 41050	0603 10V 1μF COL R
2424	4822 124 80483	47μF 20% 6.3V
2425	2238 586 59812	0603 50V 100NP80M
2427	3198 017 41050	0603 10V 1μF COL R
2428	4822 124 11947	10μF 20% 16V
2429	4822 124 11946	22μF 20% 16V
2430	2238 586 59812	0603 50V 100NP80M
2432	4822 124 42234	100μF 20% 6.3V
2433	3198 017 34730	0603 16V 47nF COL
2434	4822 124 80483	47μF 20% 6.3V
2435	2238 586 59812	0603 50V 100NP80M
2436	3198 017 41050	0603 10V 1μF COL R
2437	3198 017 41050	0603 10V 1μF COL R
2438	3198 017 41050	0603 10V 1μF COL R
2439	2238 586 59812	0603 50V 100NP80M
2440	3198 017 41050	0603 10V 1μF COL R
2441	3198 017 41050	0603 10V 1μF COL R
2442	4822 124 11946	22μF 20% 16V
2443	4822 124 42234	100μF 20% 6.3V
2444	4822 126 13881	470pF 5% 50V
2445	4822 126 13881	470pF 5% 50V
2446	3198 017 41050	0603 10V 1μF COL R
2447	4822 126 13881	470pF 5% 50V
2448	4822 126 13881	470pF 5% 50V
2449	4822 126 13956	68pF 5% 63V CASE 0603
2450	2238 586 59812	0603 50V 100NP80M
2459	3198 017 41050	0603 10V 1μF COL R
2460	4822 124 40769	4.7μF 20% 100V
2461	4822 124 40769	4.7μF 20% 100V
2462	4822 124 11947	10μF 20% 16V
2463	4822 124 11947	10μF 20% 16V
2464	4822 124 21732	10μF 20% 25V
2501	3198 017 41050	0603 10V 1μF COL R
2502	2238 586 59812	0603 50V 100NP80M
2503	2238 586 59812	0603 50V 100NP80M
2504	3198 017 41050	0603 10V 1μF COL R
2505	3198 017 41050	0603 10V 1μF COL R
2506	3198 017 41050	0603 10V 1μF COL R
2507	3198 017 41050	0603 10V 1μF COL R
2508	3198 017 41050	0603 10V 1μF COL R
2509	2238 586 59812	0603 50V 100NP80M
2510	4822 124 42234	100μF 20% 6.3V
2511	2020 009 90097	EL BP NA 16V S 100μF PM20 A
2512	2238 586 59812	0603 50V 100NP80M
2513	3198 017 41050	0603 10V 1μF COL R
2514	2238 586 59812	0603 50V 100NP80M
2515	3198 017 41050	0603 10V 1μF COL R
2516	2020 009 90097	EL BP NA 16V S 100μF PM20 A
2517	5322 126 11578	1nF 10% 50V 0603
2518	2238 586 59812	0603 50V 100NP80M
2519	4822 124 42234	100μF 20% 6.3V
2520	5322 126 11578	1nF 10% 50V 0603
2521	2238 586 59812	0603 50V 100NP80M
2522	2020 009 90097	EL BP NA 16V S 100μF PM20 A
2523	5322 126 11578	1nF 10% 50V 0603
2524	3198 017 41050	0603 10V 1μF COL R
2525	3198 017 41050	0603 10V 1μF COL R
2526	2020 009 90097	EL BP NA 16V S 100μF PM20 A
2527	5322 126 11578	1nF 10% 50V 0603
2530	2238 586 59812	0603 50V 100NP80M
2535	2238 586 59812	0603 50V 100NP80M
2536	2238 586 59812	0603 50V 100NP80M
2580	2238 586 59812	0603 50V 100NP80M
2581	4822 124 42234	100μF 20% 6.3V
2585	2238 586 59812	0603 50V 100NP80M
2586	5322 126 11578	1nF 10% 50V 0603
2587	3198 017 41050	0603 10V 1μF COL R
2590	4822 122 33753	150pF 5% 50V
2600	4822 124 21732	10μF 20% 25V
2601	5322 126 11583	10nF 10% 50V 0603
2602	4822 124 21732	10μF 20% 25V
2603	2238 586 59812	0603 50V 100NP80M
2604	5322 126 11583	10nF 10% 50V 0603
2605	4822 124 21732	10μF 20% 25V
2606	2238 586 59812	0603 50V 100NP80M
2607	4822 126 14225	56pF 5% 50V 0603

2608	4822 124 21732	10μF 20% 25V
2609	4822 126 14225	56pF 5% 50V 0603
2610	5322 126 11583	10nF 10% 50V 0603
2611	4822 124 80231	47μF 20% 16V
2612	4822 124 40769	4.7μF 20% 100V
2616	5322 126 11578	1nF 10% 50V 0603
2617	5322 126 11578	1nF 10% 50V 0603
2620	3198 016 33380	0603 50V 3P3 COL
2621	3198 016 33380	0603 50V 3P3 COL
2623	2238 586 59812	0603 50V 100NP80M
2626	4822 124 22652	2.2μF 20% 50V
2627	4822 124 22652	2.2μF 20% 50V
2713	4822 124 11946	22μF 20% 16V
2719	4822 126 13883	220pF 5% 50V
2720	4822 124 42234	100μF 20% 6.3V
2721	5322 122 33861	120pF 10% 50V
2722	5322 124 41379	2.2μF 20% 50V
2723	4822 126 13881	470pF 5% 50V
2724	2238 586 59812	0603 50V 100NP80M
2725	4822 122 33761	22pF 5% 50V
2727	2238 586 59812	0603 50V 100NP80M
2728	5322 126 11583	10nF 10% 50V 0603
2729	4822 124 21732	10μF 20% 25V
2730	4822 126 13879	220nF 20% 16V
2731	2020 552 94523	0603 50V 8P2 PM0P5
2732	4822 124 22652	2.2μF 20% 50V
2733	2238 586 59812	0603 50V 100NP80M
2734	5322 126 11578	1nF 10% 50V 0603
2737	4822 124 80483	47μF 20% 6.3V
2740	4822 124 22652	2.2μF 20% 50V
2741	5322 126 11578	1nF 10% 50V 0603
2742	5322 126 11578	1nF 10% 50V 0603
2932	2238 586 59812	0603 50V 100NP80M
2933	4822 124 80483	47μF 20% 6.3V
2934	2238 586 59812	0603 50V 100NP80M
2935	2238 586 59812	0603 50V 100NP80M
2936	4822 122 33761	22pF 5% 50V
2937	4822 122 33761	22pF 5% 50V
2938	2238 586 59812	0603 50V 100NP80M
2940	2238 586 59812	0603 50V 100NP80M
2941	4822 124 21732	10μF 20% 25V
2942	4822 126 14238	0603 50V 2N2 COL R
2943	4822 126 14508	180pF 5% 50V 0603
2944	4822 126 14238	0603 50V 2N2 COL R
2945	4822 126 14508	180pF 5% 50V 0603
2946	3198 017 41050	0603 10V 1μF COL R
2947	3198 017 41050	0603 10V 1μF COL R



3001	4822 117 13613	2Ω 5% 0603
3002	4822 117 13613	2Ω 5% 0603
3003	4822 051 30103	10k 5% 0.062W
3004	4822 117 12139	22Ω 5% 0.062W
3005	4822 117 12139	22Ω 5% 0.062W
3006	4822 117 12139	22Ω 5% 0.062W
3007	4822 117 12925	47k 1% 0.063

3301▲	4822 053 21335	3M3 5% 0.5W	3426	4822 051 30333	33k 5% 0.062W	3528	4822 051 30472	4k7 5% 0.062W
3302	4822 051 30102	1k 5% 0.062W	3427	4822 051 30759	75Ω 5% 0.062W	3529	4822 051 30472	4k7 5% 0.062W
3303	4822 051 30102	1k 5% 0.062W	3428	4822 117 13632	100k 1% 0603 0.62W	3530	4822 117 12968	820Ω 5% 0.62W
3304▲	4822 051 30103	10k 5% 0.062W	3429	4822 117 12925	47k 1% 0.063W 0603	3531	4822 117 12968	820Ω 5% 0.62W
3305▲	4822 053 21684	680k 5% 0.5W	3431	4822 051 30472	4k7 5% 0.062W	3532	4822 050 11002	1k 1% 0.4W
3306	4822 116 83872	220Ω 5% 0.5W	3432	4822 116 52175	100Ω 5% 0.5W	3533	4822 050 11002	1k 1% 0.4W
3307	4822 051 30103	10k 5% 0.062W	3433	4822 116 52175	100Ω 5% 0.5W	3534	4822 117 13632	100k 1% 0603 0.62W
3308	4822 116 52272	330k 5% 0.5W	3434	4822 116 52283	4k7 5% 0.5W	3580	4822 051 30759	75Ω 5% 0.062W
3309	4822 116 52272	330k 5% 0.5W	3435	4822 116 52201	75Ω 5% 0.5W	3581	4822 051 30222	2k2 5% 0.062W
3310	4822 116 52272	330k 5% 0.5W	3436	4822 116 52199	68Ω 5% 0.5W	3582	4822 051 30331	330Ω 5% 0.062W
3311	4822 051 30102	1k 5% 0.062W	3437	4822 051 30103	10k 5% 0.062W	3584	4822 051 30471	470Ω 5% 0.062W
3312	4822 051 30221	220Ω 5% 0.062W	3438	4822 051 30103	10k 5% 0.062W	3585	4822 051 30561	560Ω 5% 0.062W
3313	4822 116 52234	100k 5% 0.5W	3439	4822 051 30103	10k 5% 0.062W	3600	4822 051 30103	10k 5% 0.062W
3314	4822 117 13611	1k 1% 0603 ERJ3Ω	3440	4822 051 30103	10k 5% 0.062W	3601	4822 116 52175	100Ω 5% 0.5W
3315	4822 117 12902	8k2 1% 0.063W 0603	3441	4822 116 52201	75Ω 5% 0.5W	3602	4822 051 30472	4k7 5% 0.062W
3316	5322 117 13026	4k7 1% 0.063W 0603 RC22H	3442	4822 051 30154	150k 5% 0.062W	3603	4822 116 52175	100Ω 5% 0.5W
3317	4822 051 30102	1k 5% 0.062W	3443	4822 117 13632	100k 1% 0603 0.62W	3606	4822 051 30102	1k 5% 0.062W
3318	4822 116 52175	100Ω 5% 0.5W	3444	4822 117 13632	100k 1% 0603 0.62W	3607	4822 051 30102	1k 5% 0.062W
3321	2322 193 14477	RST MFLM PR01 A 0Ω47 PM5 A	3445	4822 051 30151	150Ω 5% 0.062W	3611	4822 051 30101	100Ω 5% 0.062W
3323	4822 117 12891	220k 1% ERJ3Ω	3446	4822 117 12925	47k 1% 0.063W 0603	3612	4822 051 30101	100Ω 5% 0.062W
3324	2322 702 60564	RST SMD 0603 560k 5%	3447	4822 116 83884	47k 5% 0.5W	3701	4822 116 52228	680Ω 5% 0.5W
3325	4822 117 12925	47k 1% 0.063W 0603	3448	4822 051 30471	470Ω 5% 0.062W	3702	4822 051 30471	470Ω 5% 0.062W
3326▲	4822 116 52175	100Ω 5% 0.5W	3449	4822 051 30151	150Ω 5% 0.062W	3703	4822 116 52245	150k 5% 0.5W
3327	4822 051 30105	1M 5% 0.062W	3450	4822 051 30471	470Ω 5% 0.062W	3704	4822 051 30221	220Ω 5% 0.062W
3328	4822 051 30103	10k 5% 0.062W	3451	4822 050 21003	10k 1% 0.6W	3705	4822 051 30103	10k 5% 0.062W
3329	3198 021 32250	RST SM 0603 2M 2 PM5 COL R	3452	4822 051 30151	150Ω 5% 0.062W	3710	4822 051 30562	5k6 5% 0.063W 0603 RC21 RST SM
3330	4822 051 30471	470Ω 5% 0.062W	3454	4822 050 11002	1k 1% 0.4W	3711	4822 051 30333	33k 5% 0.062W
3331	4822 051 30109	10k 5% 0.062W	3455	4822 051 30103	10k 5% 0.062W	3714	4822 051 30183	18k 5% 0.062W
3332	2120 108 93941	RST SM 0603 MCR03 5k62 PM1 R	3458	4822 051 30472	4k7 5% 0.062W	3715	4822 051 30103	10k 5% 0.062W
3333	5322 117 13026	4k7 1% 0.063W 0603 RC22H	3459	4822 051 30103	10k 5% 0.062W	3716	4822 051 30472	4k7 5% 0.062W
3335	4822 051 30471	470Ω 5% 0.062W	3460	4822 051 30472	4k7 5% 0.062W	3717	4822 051 30472	4k7 5% 0.062W
3336	4822 051 30471	470Ω 5% 0.062W	3461	2322 574 10402	VDR 0805 1M A/6V4 MAX 21VR	3720	4822 051 30331	330Ω 5% 0.062W
3337	4822 051 30102	1k 5% 0.062W	3462	2322 574 10402	VDR 0805 1M A/6V4 MAX 21VR	3724	4822 100 12158	22k 30%
3338	4822 051 30221	220Ω 5% 0.062W	3463	2322 574 10402	VDR 0805 1M A/6V4 MAX 21VR	3725	4822 117 12902	8k2 1% 0.063W 0603
3339	5322 117 13026	4k7 1% 0.063W 0603 RC22H	3464	2322 574 10402	VDR 0805 1M A/6V4 MAX 21VR	3726	4822 051 30101	100Ω 5% 0.062W
3340	5322 117 13026	4k7 1% 0.063W 0603 RC22H	3465	2322 574 10402	VDR 0805 1M A/6V4 MAX 21VR	3727	4822 117 12917	1Ω 5% 0.062W CASE0603
3341	4822 051 30683	68k 5% 0.062W	3466	2322 574 10402	VDR 0805 1M A/6V4 MAX 21VR	3728	4822 051 30101	100Ω 5% 0.062W
3342	5322 117 13026	4k7 1% 0.063W 0603 RC22H	3467	2322 574 10402	VDR 0805 1M A/6V4 MAX 21VR	3729	4822 117 12917	1Ω 5% 0.062W CASE0603
3343	5322 117 13026	4k7 1% 0.063W 0603 RC22H	3468	2322 574 10402	VDR 0805 1M A/6V4 MAX 21VR	3730	4822 051 30472	4k7 5% 0.062W
3344	4822 051 30683	68k 5% 0.062W	3469	4822 117 13632	100k 1% 0603 0.62W	3731	4822 051 30271	270Ω 5% 0.062W
3346	4822 051 30222	2k2 5% 0.062W	3470	4822 117 13632	100k 1% 0603 0.62W	3731	4822 051 30331	330Ω 5% 0.062W
3347	4822 051 30472	4k7 5% 0.062W	3471	4822 117 13632	100k 1% 0603 0.62W	3732	4822 051 30102	1k 5% 0.062W
3348	4822 051 30681	680Ω 5% 0.062W	3472	4822 117 13632	100k 1% 0603 0.62W	3733	4822 051 30472	4k7 5% 0.062W
3349	4822 051 30479	47Ω 5% 0.062W	3473	4822 051 30101	100Ω 5% 0.062W	3734	4822 051 30272	2k7 5% 0.062W
3350	4822 051 30102	1k 5% 0.062W	3474	4822 051 30101	100Ω 5% 0.062W	3735	4822 051 30332	3k3 5% 0.062W
3351	2322 702 60564	RST SMD 0603 560k 5%	3475	4822 051 30101	100Ω 5% 0.062W	3736	4822 051 30331	330Ω 5% 0.062W
3352	2322 193 14687	RST MFLM PR01 A 0Ω68 PM5	3476	4822 051 30101	100Ω 5% 0.062W	3737	4822 051 30222	2k2 5% 0.062W
3353	4822 051 30272	2k7 5% 0.062W	3477	4822 051 30101	100Ω 5% 0.062W	3738	4822 051 30682	6k8 5% 0.062W
3354	4822 051 30272	2k7 5% 0.062W	3478	4822 051 30101	100Ω 5% 0.062W	3739	4822 051 30562	5k6 5% 0.063W 0603 RC21 RST SM
3355	4822 051 30479	47Ω 5% 0.062W	3487	4822 117 13632	100k 1% 0603 0.62W	3740	4822 051 30681	680Ω 5% 0.062W
3356	4822 116 52228	680Ω 5% 0.5W	3488	4822 117 13632	100k 1% 0603 0.62W	3741	4822 051 30472	4k7 5% 0.062W
3357	4822 051 30472	4k7 5% 0.062W	3489	4822 117 12864	82k 5% 0.6W	3742	4822 051 30472	4k7 5% 0.062W
3358	4822 051 30109	10Ω 5% 0.062W	3490	4822 051 30151	150Ω 5% 0.062W	3743	4822 051 30563	56k 5% 0.062W
3360	4822 116 52231	820Ω 5% 0.5W	3491	4822 051 30151	150Ω 5% 0.062W	3744	4822 117 13632	100k 1% 0603 0.62W
3361	4822 051 30102	1k 5% 0.062W	3492	4822 051 30151	150Ω 5% 0.062W	3745	4822 051 30562	5k6 5% 0.063W 0603 RC21 RST SM
3362	4822 051 30681	680Ω 5% 0.062W	3493	4822 051 30151	150Ω 5% 0.062W	3746	4822 051 30562	5k6 5% 0.063W 0603 RC21 RST SM
3363	4822 051 30222	2k2 5% 0.062W	3494	4822 051 30151	150Ω 5% 0.062W	3758	4822 051 30103	10k 5% 0.062W
3364	4822 051 30103	10k 5% 0.062W	3495	4822 051 30472	4k7 5% 0.062W	3931	4822 117 12925	47k 1% 0.063W 0603
3365	4822 051 30332	3k3 5% 0.062W	3496	4822 051 30472	4k7 5% 0.062W	3932	4822 117 12925	47k 1% 0.063W 0603
3366	4822 051 30152	1k5 5% 0.063W 0603	3501	4822 051 30102	1k 5% 0.062W	3933	4822 117 12925	47k 1% 0.063W 0603
3367	4822 117 12903	1k8 1% 0.063W 0603	3502	4822 050 11002	1k 1% 0.4W	3934	4822 051 30101	100Ω 5% 0.062W
3368	4822 051 30332	3k3 5% 0.062W	3503	4822 117 13632	100k 1% 0603 0.62W	3935	4822 051 30101	100Ω 5% 0.062W
3371	4822 051 30479	47Ω 5% 0.062W	3504	4822 117 13632	100k 1% 0603 0.62W	3936	4822 051 30103	10k 5% 0.062W
3372	4822 051 30339	33Ω 5% 0.062W	3505	4822 117 13632	100k 1% 0603 0.62W	3937	4822 051 30222	2k2 5% 0.062W
3373	4822 051 30339	33Ω 5% 0.062W	3506	4822 117 13632	100k 1% 0603 0.62W	3938	4822 051 30222	2k2 5% 0.062W
3401	4822 051 30152	75Ω 1% 0.062W	3507	4822 117 13632	100k 1% 0603 0.62W	3939	4822 051 30472	4k7 5% 0.062W
3402	4822 051 30152	75Ω 1% 0.062W	3508	4822 051 30102	1k 5% 0.062W	3940	3198 021 31060	RST SM 0603 10M PM5COL R
3403	4822 051 30152	75Ω 1% 0.062W	3509	4822 050 11002	1k 1% 0.4W	3941	3198 021 31060	RST SM 0603 10M PM5COL R
3404	4822 051 30759	75Ω 5% 0.062W	3510	4822 117 13632	100k 1% 0603 0.62W	3942	4822 051 30333	33k 5% 0.062W
3405	4822 051 30223	22k 5% 0.062W	3511	4822 117 13632	100k 1% 0603 0.62W	3943	4822 051 30333	33k 5% 0.062W
3406	4822 117 12891	220k 1% ERJ3Ω	3512	4822 051 30102	1k 5% 0.062W	3944	4822 051 30333	33k 5% 0.062W
3407	4822 051 30332	3k3 5% 0.062W	3513	4822 051 30102	1k 5% 0.062W	3945	4822 051 30333	33k 5% 0.062W
3408	4822 051 30392	3k9 5% 0.063W 0603	3514	4822 117 13632	100k 1% 0603 0.62W	3946	4822 051 30333	33k 5% 0.062W
3409	4822 051 30152	75Ω 1% 0.062W	3515	4822 050 11002	1k 1% 0.4W	3947	4822 051 30333	33k 5% 0.062W
3410	4822 051 30152	75Ω 1% 0.062W	3516	4822 117 13632	100k 1% 0603 0.62W	3948	4822 051 30472	4k7 5% 0.062W
3411	4822 051 30759	75Ω 5% 0.062W	3517	4822 116 52283	4k7 5% 0.5W	3950	4822 117 13632	100k 1% 0603 0.62W
3412	4822 116 52201	75Ω 5% 0.5W	3518	4822 051 30102	1k 5% 0.062W	3951	4822 051 30223	22k 5% 0.062W
3413	4822 051 30152	75Ω 1% 0.062W	3519	4822 116 52283	4k7 5% 0.5W	3952	4822 051 30153	15k 5% 0.062W
3414	4822 051 30759	75Ω 5% 0.062W	3520	4822 051 30221	220Ω 5% 0.062W	3953	4822 051 30472	4k7 5% 0.062W
3415	4822 051 30102	1k 5% 0.062W	3521	4822 051 30221	220Ω 5% 0.062W	3954	4822 051 30472	4k7 5% 0.062W
3416	4822 051 30472	4k7 5% 0.062W	3522	4822 051 30221	220Ω 5% 0.062W	3955	4822 051 30103	10k 5% 0.062W
3417	4822 051 30759	75Ω 5% 0.062W	3523	4822 050 11002	1k 1% 0.4W			
3418	4822 117 13632	100k 1% 0603 0.62W	3524	4822 117 12968	820Ω 5% 0.62W			
3419	4822 051 30223	22k 5% 0.062W	3525	4822 051 30221	220Ω 5% 0.062W			
3420	4822 051 30151	150Ω 5%						

5302▲	2422 549 44509	MAINS 25mH 0A4 HF2022R Y	6422	9322 129 34685	DIO REG SM BZM55-C3V9 (TEGO)	7702	4822 130 61553	DTC124EU
5304	4822 157 70826	2.4μH	6423	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7704	4822 130 61553	DTC124EU
5305	4822 157 70826	2.4μH				7705	4822 130 61553	DTC124EU
5306	2422 535 94634	IND FXD LHL08 S 2U2 PM20 A	6424	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7706	4822 130 61553	DTC124EU
5307	4822 157 11737	22μH 10% 9X9.5	6425	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7710	9352 606 11118	IC SM TDA9818T/V1(PHSE) R
5308	4822 157 11737	22μH 10% 9X9.5				7710	9352 621 13118	IC SM TDA9817T/V1(PHSE) R
5309	4822 157 11737	22μH 10% 9X9.5	6426	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7711	3198 010 42320	BC857BW
5401	4822 157 11706	10μH 5% 2.4X3.4	6427	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7712	4822 130 61553	DTC124EU
5402	4822 157 11706	10μH 5% 2.4X3.4				7713	3198 010 42320	BC857BW
5403	4822 157 11706	10μH 5% 2.4X3.4	6428	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7714	3198 010 42310	BC847BW
5404	4822 157 11706	10μH 5% 2.4X3.4				7716	3198 010 42320	BC857BW
5406	4822 157 11706	10μH 5% 2.4X3.4	6429	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7717	5322 130 42755	BC847C
5580	2422 536 00019	TRANSFORMER 6RG (SAGA) B				7931	4822 209 17505	STV5348D
5581	4822 157 11706	10μH 5% 2.4X3.4	6600	4822 130 83757	MCL4148	7932	3198 010 42310	BC847BW
5600▲	4822 157 11706	10μH 5% 2.4X3.4	6703	9340 552 30115	DIO SIG SM BA591 (PHSE)	7933	3198 010 42310	BC847BW
5601▲	4822 157 11706	10μH 5% 2.4X3.4	6704	9340 552 30115	DIO SIG SM BA591 (PHSE)	7934	4822 209 60177	LM339D
5602▲	4822 157 11706	10μH 5% 2.4X3.4	6705	9340 552 30115	DIO SIG SM BA591 (PHSE)			
5705	4822 157 11139	6.8μH 5%						
5709	4822 157 11139	6.8μH 5%						
5710	2422 549 44162	IND VAR 7MM Y 77M8 B						
5711	2422 549 44162	IND VAR 7MM Y 77M8 B						
5713	4822 157 11747	15μH 5%						
5714	4822 157 11747	15μH 5%						
5931	4822 157 11706	10μH 5% 2.4X3.4						
5932	4822 157 11074	100μH						
→←						UPC12 Sub PWB		
6001	4822 130 83757	MCL4148				Various		
6002	4822 130 83757	MCL4148	7001	9352 668 47118	IC SM UDA1334BTS/N2 (PHSE) R	1801	2422 543 01115	RES XTL SM 24M576 12P CX-11F R
6003	4822 130 83757	MCL4148	7002	4822 209 62312	MC33078D	1805	4822 242 70938	TA252E00 (32,768KHZ)
6300	9322 182 65682	DIO REC STTH302-C2 (ST00) B	7003	4822 130 60854	DTA124EU-W	1980	2422 025 17723	CON BM V 8P M2.00 C36 B
6301	4822 130 31603	1N4006	7005	9352 670 99118	IC SM UDA1361TS/N1 (PHSE) R	1984	2422 025 17723	CON BM V 8P M2.00 C36 B
6302	4822 130 31603	1N4006				1986	2422 025 16677	CON BM H 10P F 1.00 FFC SMT R
6303	9322 182 65682	DIO REC STTH302-C2 (ST00) B	7006	3198 010 42320	BC857BW	1987	2422 025 17723	CON BM V 8P M2.00 C36 B
6304	4822 130 31878	1N4003G	7008	3198 010 42310	BC847BW	1988	2422 025 17723	CON BM V 8P M2.00 C36 B
6305	4822 130 31603	1N4006	7009	3198 010 42310	BC847BW			
6306	4822 130 31603	1N4006	7010	4822 130 61553	DTC124EU			
6307	9322 161 77682	DIO REC SB540L-7024 (GI00) B	7011	3198 010 42320	BC857BW			
6308	9322 161 77682	DIO REC SB540L-7024 (GI00) B	7301	4822 209 14933	TL431IZ			
6309	9322 126 71673	DIO REC BYT42M A (TEG0) A	7302	9322 163 75685	FET SIG SM SI2306DS(VISH)			
6310	9322 182 65682	DIO REC STTH302-C2 (ST00) B	7303	9322 183 38668	FET POW SM STS9NF30L (ST00)			
6311	4822 130 31878	1N4003G	7304	4822 209 14933	TL431IZ			
6312	9322 129 38685	DIO REG SM BZM55-C6V8 (TEG0)	7305	4822 209 14933	TL431IZ			
6313	4822 130 10871	SBYV27-200	7306	4822 130 61553	DTC124EU			
6314	9322 129 39685	BZM55-C8V2	7307	9322 157 37687	FET POW STP3NC60FP (ST00) L			
6315	4822 130 83757	MCL4148	7308	4822 130 61553	DTC124EU			
6316	4822 130 30842	BAV21	7309	9322 180 12685	FET POW SM SI2312DS (VISH) R			
6317	4822 130 42488	BYD33D	7310	3198 010 42310	BC847BW			
6318	3198 010 53390	DIO REG BZX79-B33 A COL A	7311	3198 010 42310	BC847BW			
6319	4822 130 42488	BYD33D	7312	4822 130 41782	BF422			
6320	4822 130 11397	BAS316	7313	9352 673 56112	IC TEA1507P/N1 (PHSE) L			
6321	4822 130 10654	BAT254	7314▲	9965 000 09548	PHOTOCOUPLER TCET1108G VISHAY			
6322	9322 129 38685	DIO REG SM BZM55-C6V8 (TEG0)	7315	4822 209 14933	TL431IZ			
6324	4822 130 82346	BZV55-C27	7317	9322 163 75685	FET SIG SM SI2306DS(VISH)			
6325	4822 130 10871	SBYV27-200	7318	9322 163 75685	FET SIG SM SI2306DS(VISH)			
6401	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7319	5322 130 60159	BC846B			
6402	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7320	9322 163 75685	FET SIG SM SI2306DS(VISH)			
6403	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7321	4822 130 61553	DTC124EU			
6404	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7322	3198 010 42320	BC857BW			
6409	9322 129 38685	DIO REG SM BZM55-C6V8 (TEG0)	7401	3198 010 42320	BC857BW			
6414	9322 129 38685	DIO REG SM BZM55-C6V8 (TEG0)	7402	3198 010 42310	BC847BW			
6415	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7403	3198 010 42320	BC857BW			
6416	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7404	3198 010 42320	BC857BW			
6417	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7405	3198 010 42310	BC847BW			
6418	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7406	3198 010 42320	BC857BW			
6419	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7407	3198 010 42310	BC847BW			
6420	9340 548 61115	DIO REG SM PDZ12B (PHSE) R	7408	9322 173 41668	IC SM ST6618 (ST00)R			
			7409	3198 010 42310	BC847BW			
			7410	9965 000 03392	NJM2267M			
			7411	9322 179 71668	IC SM NJM2285M (JRC0) R			
			7412	4822 130 61553	DTC124EU			
			7415	4822 130 42804	BC817-25			
			7416	4822 130 42804	BC817-25			
			7419	9340 560 36235	BSH111			
			7420	9340 560 36235	BSH111			
			7421	3198 010 42310	BC847BW			
			7501	5322 209 11102	HEF4052BT			
			7502	4822 209 32071	MC33079D			
			7503	5322 209 11102	HEF4052BT			
			7504	5322 209 11102	HEF4052BT			
			7505	4822 209 62312	MC33078D			
			7506	4822 130 42804	BC817-25			
			7508	4822 130 42804	BC817-25			
			7509	4822 130 42804	BC817-25			
			7511	4822 130 42804	BC817-25			
			7580	5322 209 11517	PC74HCU04T			
			7600	9322 167 63668	IC SM MSP3415G-QG-B8 (MIAS) R			
			7701	4822 130 61553	DTC124EU			

3823	4822 117 13632	100k 1% 0603 0.62W
3824	4822 051 30102	1k 5% 0.062W
3825	4822 051 30101	100Ω 5% 0.062W
3826	4822 051 30102	1k 5% 0.062W
3827	4822 051 30102	1k 5% 0.062W
3828	4822 051 30103	10k 5% 0.062W
3829	4822 051 30103	10k 5% 0.062W
3830	4822 051 30102	1k 5% 0.062W
3831	4822 051 30102	1k 5% 0.062W
3832	4822 051 30333	33k 5% 0.062W
3833	4822 051 30102	1k 5% 0.062W
3834	4822 051 30102	1k 5% 0.062W
3835	4822 051 30102	1k 5% 0.062W
3836	4822 051 30101	100Ω 5% 0.062W
3837	4822 051 30123	12k 5% 0.062W
3838	4822 051 30102	1k 5% 0.062W
3839	4822 051 30273	27k 5% 0.062W
3840	4822 051 30472	4k7 5% 0.062W
3841	4822 117 13632	100k 1% 0603 0.62W
3842	4822 117 12891	220k 1% ERJ3Ω
3843	4822 051 30333	33k 5% 0.062W
3844	4822 051 30221	220Ω 5% 0.062W
3845	4822 051 30102	1k 5% 0.062W
3846	4822 051 30333	33k 5% 0.062W
3847	4822 051 30103	10k 5% 0.062W
3849	4822 117 12925	47k 1% 0.063W 0603
3850	4822 051 30183	18k 5% 0.062W
3851	4822 051 30103	10k 5% 0.062W
3852	4822 051 30103	10k 5% 0.062W
3854	4822 051 30103	10k 5% 0.062W
3855	4822 051 30471	470Ω 5% 0.062W
3856	4822 051 30103	10k 5% 0.062W
3857	4822 051 30103	10k 5% 0.062W
3858	4822 117 13632	100k 1% 0603 0.62W
3860	4822 051 30222	2k2 5% 0.062W
3861	3198 021 32250	RST SM 0603 2M 2 PM5 COL R
3862	4822 051 30103	10k 5% 0.062W
3863	4822 117 13608	4.7Ω 5% 0603 0.0016W
3864	4822 117 13608	4.7Ω 5% 0603 0.0016W
3865	4822 117 13608	4.7Ω 5% 0603 0.0016W
3866	4822 117 13608	4.7Ω 5% 0603 0.0016W
3867	4822 051 30759	75Ω 5% 0.062W
3868	4822 051 30103	10k 5% 0.062W
3869	4822 051 30331	330Ω 5% 0.062W
3870	4822 117 13632	100k 1% 0603 0.62W
3871	4822 051 30103	10k 5% 0.062W
3872	4822 051 30103	10k 5% 0.062W
3873	4822 051 30472	4k7 5% 0.062W
3876	4822 051 30103	10k 5% 0.062W
3878	4822 051 30102	1k 5% 0.062W
3879	4822 051 30102	1k 5% 0.062W
3881	4822 117 12925	47k 1% 0.063W 0603
3882	4822 117 12925	47k 1% 0.063W 0603
3884	4822 051 30101	100Ω 5% 0.062W
3885	4822 051 30101	100Ω 5% 0.062W
3886	4822 051 30472	4k7 5% 0.062W
3887	4822 051 30472	4k7 5% 0.062W
3888	4822 051 30471	470Ω 5% 0.062W
3889	4822 051 30183	18k 5% 0.062W
3916	4822 051 30273	27k 5% 0.062W
3917	2322 704 65603	RST SM 0603 RC22H 56k PM1 R
3919	5322 117 13024	33k 1% 0.063W 0603 RC22H
3920	4822 051 30562	5k6 5% 0.063W 0603 RC21 RST SM
3921	4822 051 30471	470Ω 5% 0.062W
3922	4822 051 30102	1k 5% 0.062W
3923	4822 051 30103	10k 5% 0.062W
3925	4822 117 12706	10k 1% 0.063W CASE0603 RC22H
3927	4822 117 12864	82k 5% 0.6W



5801	2422 549 44607	IND FXD SM EMI100mH z 600RR
5802	2422 549 44607	IND FXD SM EMI100mH z 600RR
5803	2422 549 44607	IND FXD SM EMI100mH z 600RR
5804	2422 549 44607	IND FXD SM EMI100mH z 600RR



6800	4822 130 11397	BAS316
6801	9322 129 34685	DIO REG SM BZM55-C3V9 (TEGO)
6802	4822 130 10654	BAT254
6803	4822 130 10654	BAT254
6804	4822 130 10654	BAT254

6901	5322 130 34331	BAV70
6903	5322 130 34331	BAV70
7801	9352 190 00118	IC SM 74LVC573AD (PHSE) R
7802	4822 130 61553	DTC124EU
7803	9322 131 96668	IC SM CY62128VL-70SC (CYPR) R
7804	3103 165 13721	IC TMP91CW12AF/LIRP1
7805	9965 000 13398	M29W800AT-80N1/ AN110021
7806	9322 163 26685	IC SM NCP301LSN30 (ONSE) R
7807	4822 209 73852	PMBT2369
7808	4822 209 16907	M24C16-MN6T
7813	3198 010 42310	BC847BW
7814	3198 010 42310	BC847BW
7815	3198 010 42310	BC847BW
7816	3198 010 42310	BC847BW
7817	3198 010 42310	BC847BW
7818	4822 130 60854	DTA124EU-W
7821	9340 560 36235	BSH111
7822	9340 560 36235	BSH111
7825	8203 107 03690	IC LA7213
7902	5322 209 82941	LM358D

DVIO PWB DVDR890

Various

1101	2422 025 17106	CON BM H 4P F 0.8 IEEE R
1102	2422 543 01115	RES XTL SM 24M576 12P CX-11F R
1200	2422 543 01159	RES XTL SM 11M0592 20P DSX840
1500	2422 025 17084	CON BM V 60P F 0.80 179161 R



2146	2238 586 59812	0603 50V 100NP80M
2147	2238 586 59812	0603 50V 100NP80M
2148	2238 586 59812	0603 50V 100NP80M
2149	2238 586 59812	0603 50V 100NP80M
2150	2238 586 59812	0603 50V 100NP80M
2151	2238 586 59812	0603 50V 100NP80M
2152	2238 586 59812	0603 50V 100NP80M
2153	2238 586 59812	0603 50V 100NP80M
2154	2238 586 59812	0603 50V 100NP80M
2155	2238 586 59812	0603 50V 100NP80M
2156	2238 586 59812	0603 50V 100NP80M
2157	2238 586 59812	0603 50V 100NP80M
2158	3198 017 41050	0603 10V 1μF COL R
2163	4822 126 14506	270pF 5% 50V 0603
2170	4822 126 11663	12pF
2171	4822 126 11663	12pF
2173	4822 124 23002	10μF 16V
2174	2238 586 59812	0603 50V 100NP80M
2175	4822 124 23002	10μF 16V
2176	2238 586 59812	0603 50V 100NP80M
2177	2238 586 59812	0603 50V 100NP80M
2178	2238 586 59812	0603 50V 100NP80M
2181	4822 124 12095	100μF 20% 16V
2182	4822 124 23002	10μF 16V
2183	2238 586 59812	0603 50V 100NP80M
2184	2238 586 59812	0603 50V 100NP80M
2187	2238 586 59812	0603 50V 100NP80M
2192	2238 586 59812	0603 50V 100NP80M
2193	2238 586 59812	0603 50V 100NP80M
2194	2238 586 59812	0603 50V 100NP80M
2195	2238 586 59812	0603 50V 100NP80M
2196	2238 586 59812	0603 50V 100NP80M
2197	2238 586 59812	0603 50V 100NP80M
2200	4822 126 11663	12pF
2202	2238 586 59812	0603 50V 100NP80M
2203	2238 586 59812	0603 50V 100NP80M
2204	2238 586 59812	0603 50V 100NP80M
2205	4822 126 11663	12pF
2206	2020 552 94427	0603 50V 100P PM5 R
2207	2238 586 59812	0603 50V 100NP80M
2301	2238 586 59812	0603 50V 100NP80M
2302	4822 124 80151	47μF 16V
2303	2238 586 59812	0603 50V 100NP80M
2304	2238 586 59812	0603 50V 100NP80M
2305	2238 586 59812	0603 50V 100NP80M
2306	2238 586 59812	0603 50V 100NP80M
2307	2238 586 59812	0603 50V 100NP80M
2308	2238 586 59812	0603 50V 100NP80M
2309	2238 586 59812	0603 50V 100NP80M

2310	2238 586 59812	0603 50V 100NP80M
2311	2238 586 59812	0603 50V 100NP80M
2312	2238 586 59812	0603 50V 100NP80M
2313	2238 586 59812	0603 50V 100NP80M
2314	4822 124 80151	47μF 16V
2318	2238 586 59812	0603 50V 100NP80M
2319	2238 586 59812	0603 50V 100NP80M
2324	2238 586 59812	0603 50V 100NP80M
2325	2238 586 59812	0603 50V 100NP80M
2400	2238 586 59812	0603 50V 100NP80M
2401	2238 586 59812	0603 50V 100NP80M
2402	2238 586 59812	0603 50V 100NP80M
2403	2238 586 59812	0603 50V 100NP80M
2404	2238 586 59812	0603 50V 100NP80M
2405	2238 586 59812	0603 50V 100NP80M
2406	2238 586 59812	0603 50V 100NP80M
2407	2238 586 59812	0603 50V 100NP80M
2408	2238 586 59812	0603 50V 100NP80M
2409	2238 586 59812	0603 50V 100NP80M
2410	2238 586 59812	0603 50V 100NP80M
2411	2238 586 59812	0603 50V 100NP80M
2412	2238 586 59812	0603 50V 100NP80M
2413	2238 586 59812	0603 50V 100NP80M
2414	2238 586 59812	0603 50V 100NP80M
2415	2238 586 59812	0603 50V 100NP80M
2416	2238 586 59812	0603 50V 100NP80M
2417	2238 586 59812	0603 50V 100NP80M
2418	2238 586 59812	0603 50V 100NP80M
2419	2238 586 59812	0603 50V 100NP80M
2420	2238 586 59812	0603 50V 100NP80M
2421	2238 586 59812	0603 50V 100NP80M
2500	2238 586 59812	0603 50V 100NP80M
2501	2238 586 59812	0603 50V 100NP80M
2502	2238 586 59812	0603 50V 100NP80M
2503	2238 586 59812	0603 50V 100NP80M
2504	2238 586 59812	0603 50V 100NP80M
2505	4822 124 80151	47μF 16V
2506	2238 586 59812	0603 50V 100NP80M
2507	4822 124 80151	47μF 16V
2508	2238 586 59812	0603 50V 100NP80M
2509	2238 586 59812	0603 50V 100NP80M
2510	2238 586 59812	0603 50V 100NP80M
2511	4822 124 80151	47μF 16V
2512	4822 124 80151	47μF 16V
2514	4822 124 80151	47μF 16V
2515	4822 124 80151	47μF 16V
2516	5322 126 11583	10nF 10% 50V 0603
2517	5322 126 11583	10nF 10% 50V 0603
2518	4822 124 80151	47μF 16V
2519	2238 586 59812	0603 50V 100NP80M



3100	4822 117 12925	47k 1% 0.063W 0603
3101	4822 117 12925	47k 1% 0.063W 0603
3102	4822 051 30103	10k 5% 0.062W
3103	4822 051 30103	10k 5% 0.062W
3104	4822 117 12925	47k 1% 0.063W 0603
3105	4822 051 30109	10Ω 5% 0.062W
3106	4822 051 30103	10k 5% 0.062W
3107	4822 051 30109	10Ω 5% 0.062W
3108	4822 051 30109	10Ω 5% 0.062W
3109	4822 117 12925	47k 1% 0.063W 0603
3110	4822 117 12925	47k 1% 0.063W 0603
3113	4822 051 30103	10k 5% 0.062W
3115	4822 051 30102	1k 5% 0.062W
3116	4822 117 12917	1Ω 5% 0.062W CASE0603
3117	4822 051 30109	10Ω 5% 0.062W
3118	4822 117 12925	47k 1% 0.063W 0603
3119	4822 117 12925	47k 1% 0.063W 0603
3120	4822 117 12925	47k 1% 0.063W 0603
3121	4822 117 12925	47k 1% 0.063W 0603
3122	4822 117 12925	47k 1% 0.063W 0603
3123	4822 117 12925	47k 1% 0.063W 0603
3124	4822 117 12925	47k 1% 0.063W 0603
3125	4822 117 12925	47k 1% 0.063W 0603
3126	4822 117 12925	47k 1% 0.063W 0603
3127	4822 117 12925	47k 1% 0.063W 0603
3128	4822 117 12925	47k 1% 0.063W 0603</

3171	4822 051 30109	10Ω 5% 0.062W
3172	4822 051 30109	10Ω 5% 0.062W
3173	2322 734 65609	RST SM 0805 RC12H 56Ω PM1 R
3174	4822 051 30109	10Ω 5% 0.062W
3176	4822 051 30109	10Ω 5% 0.062W
3177	2322 704 65102	RST SM 0603 RC22H 5k1 PM1
3178	2322 734 65609	RST SM 0805 RC12H 56Ω PM1 R
3179	4822 051 30103	10k 5% 0.062W
3188	4822 051 30479	47Ω 5% 0.062W
3189	4822 051 30109	10Ω 5% 0.062W
3190	4822 051 30479	47Ω 5% 0.062W
3191	4822 051 30109	10Ω 5% 0.062W
3192	4822 117 12925	47k 1% 0.063W 0603
3197	4822 117 12925	47k 1% 0.063W 0603
3198	4822 117 12925	47k 1% 0.063W 0603
3199	4822 117 12925	47k 1% 0.063W 0603
3201	4822 051 30479	47Ω 5% 0.062W
3202	4822 051 30103	10k 5% 0.062W
3203	4822 051 30102	1k 5% 0.062W
3204	4822 051 30103	10k 5% 0.062W
3205	4822 117 12925	47k 1% 0.063W 0603
3206	4822 117 12925	47k 1% 0.063W 0603
3223	4822 051 30472	4k7 5% 0.062W
3224	4822 051 30331	330Ω 5% 0.062W
3225	4822 051 30109	10Ω 5% 0.062W
3300	4822 051 30109	10Ω 5% 0.062W
3301	4822 051 30102	1k 5% 0.062W
3303	4822 051 30102	1k 5% 0.062W
3305	4822 051 30102	1k 5% 0.062W
3306	4822 051 30102	1k 5% 0.062W
3307	4822 051 30102	1k 5% 0.062W
3312	4822 051 30109	10Ω 5% 0.062W
3313	4822 051 30103	10k 5% 0.062W
3314	4822 051 30103	10k 5% 0.062W
3315	4822 051 30339	33Ω 5% 0.062W
3317	4822 051 30339	33Ω 5% 0.062W
3318	4822 051 30339	33Ω 5% 0.062W
3319	4822 051 30339	33Ω 5% 0.062W
3320	4822 051 30479	47Ω 5% 0.062W
3321	4822 051 30479	47Ω 5% 0.062W
3322	4822 051 30479	47Ω 5% 0.062W
3325	4822 051 30479	47Ω 5% 0.062W
3327	4822 051 30479	47Ω 5% 0.062W
3328	4822 051 30103	10k 5% 0.062W
3329	4822 051 30103	10k 5% 0.062W
3330	4822 051 30479	47Ω 5% 0.062W
3331	4822 051 30479	47Ω 5% 0.062W
3400	4822 051 30103	10k 5% 0.062W
3401	4822 117 13573	NETW 4 X 47Ω 5% MNR14
3402	4822 117 13573	NETW 4 X 47Ω 5% MNR14
3403	4822 051 30479	47Ω 5% 0.062W
3404	4822 051 30479	47Ω 5% 0.062W
3405	4822 051 30479	47Ω 5% 0.062W
3502	4822 051 30339	33Ω 5% 0.062W
3504	4822 117 13576	NETW 4 X 33Ω 5% 1206
3505	4822 117 13576	NETW 4 X 33Ω 5% 1206
3506	4822 051 30339	33Ω 5% 0.062W
3510	4822 051 30479	47Ω 5% 0.062W
3518	4822 051 30101	100Ω 5% 0.062W
3519	4822 051 30101	100Ω 5% 0.062W
3520	4822 117 12891	220k 1% ERJ3Ω
3521	4822 117 12891	220k 1% ERJ3Ω
3524	4822 051 30339	33Ω 5% 0.062W
3525	4822 051 30339	33Ω 5% 0.062W
3526	4822 051 30339	33Ω 5% 0.062W
3527	4822 051 30339	33Ω 5% 0.062W

5103	4822 157 11499	BLM11P600SPT
5106	4822 157 11499	BLM11P600SPT
5109	4822 157 11499	BLM11P600SPT
5110	4822 157 11499	BLM11P600SPT
5200	4822 157 11499	BLM11P600SPT
5300	4822 157 11499	BLM11P600SPT
5301	4822 157 11499	BLM11P600SPT
5302	4822 157 11499	BLM11P600SPT
5303	4822 157 11499	BLM11P600SPT
5304	4822 157 11499	BLM11P600SPT
5402	4822 157 11499	BLM11P600SPT
5403	4822 157 11499	BLM11P600SPT
5404	4822 157 11499	BLM11P600SPT
5500	4822 157 11499	BLM11P600SPT
5501	4822 157 11499	BLM11P600SPT
5502	4822 157 11499	BLM11P600SPT
5503	4822 157 11499	BLM11P600SPT



6300 4822 209 17398 LD1117DT33



7101	9352 683 02157	IC SM PDI1394P25BD (PHSE) Y
7103	9352 682 52557	IC SM PDI1394L40 (PHSE) Y
7201	4822 209 91023	UM62256EM-70LL
7202	5322 130 60159	BC846B
7204	9337 331 10215	FET SIG SM BST82 (PHSE) R
7207	5322 130 60159	BC846B
7208	9352 456 40115	IC SM 74HCT1G04GW (PHSE) R
7300	3104 123 96640	IC ROM XC17S30XL DVIO 1.5
7301	9322 166 64668	IC SM CY7C1019BV33- 10VC(CXPR)R
7303	9322 169 90671	IC SM XCS30XL-4TQ144C (XILI) Y
7304	4822 242 10838	27MHZ 120P FX0-31FT
7307	3104 123 96620	IC FLASH PLL CY2071A DVIO 1.5
7308	3104 123 96620	IC FLASH PLL CY2071A DVIO 1.5
7402	9322 182 57668	MT4LC1M16E5DJ-5
7403	9322 182 57668	MT4LC1M16E5DJ-5
7404	9322 179 31671	IC SM NW700
7500	9352 424 20118	IC SM 74LVC04APW (PHSE) R
7505	9352 351 50118	IC SM 74LVC16244ADGG (PHSE) R
7506	9352 668 39118	IC SM UDA1334ATS/N2 (PHSE) R

Front DV Board DVDR890

Various

1000	2422 033 00363	CON BM H 4P F 0.8 B
1001	2422 025 17106	CON BM H 4P F 0.8 IEEE R



2000	5322 126 10511	1nF 5% 50V
2001	5322 126 10511	1nF 5% 50V
2002	2020 557 90732	250V 4N7 PM10 R
2002	2222 580 19815	50V 330nF P8020 R
2003	2020 557 90732	250V 4N7 PM10 R
2003	2222 580 19815	50V 330nF P8020 R
2004	2020 557 90732	250V 4N7 PM10 R
2005	2020 557 90732	250V 4N7 PM10 R
2204	2222 867 15339	0603 50V 33P PM5
2205	2222 867 15339	0603 50V 33P PM5



3000 4822 051 20105 1M 5% 0.1W



5000	2422 549 44768	IND FXD SM EMI 100mH z 90R R
5001	2422 549 44768	IND FXD SM EMI 100mH z 90R R



6000	4822 130 11395	TLMH3100
6001	9322 172 97668	DIO SUP SM6T39CA (ST00) R

Digital Board 1.5

Various

1100	2422 025 17018	CON BM V 15P F 1.00 FFC 0.3 R
1101	2422 025 17018	CON BM V 15P F 1.00 FFC 0.3 R
1200	2422 025 16794	CON BM V 7P F 1.00 FFC 0.3 R
1500	2422 543 01115	RES XTL SM 24M576 12P CX-11F R

1600	2422 025 16729	CON BM V 10P F 1.00 FFC 0.3 R
1601	2422 025 16389	CON BM V 22P F 1.00 FFC 0.3 R
1602	2422 025 16389	CON BM V 22P F 1.00 FFC 0.3 R
1603	2422 025 16939	CON BM V 60P F 0.80 84616 R



2100	2238 586 59812	0603 50V 100NP80M
2101	2238 586 59812	0603 50V 100NP80M
2102	2238 586 59812	0603 50V 100NP80M
2103	2238 586 59812	0603 50V 100NP80M
2104	2238 586 59812	0603 50V 100NP80M
2105	2238 586 59812	0603 50V 100NP80M
2106	2238 586 59812	0603 50V 100NP80M
2107	2238 586 59812	0603 50V 100NP80M
2108	2238 586 59812	0603 50V 100NP80M
2109	2238 586 59812	0603 50V 100NP80M
2110	2238 586 59812	0603 50V 100NP80M
2111	2238 586 59812	0603 50V 100NP80M
2112	2238 586 59812	0603 50V 100NP80M
2113	2238 586 59812	0603 50V 100NP80M
2114	2238 586 59812	0603 50V 100NP80M
2115	2238 586 59812	0603 50V 100NP80M
2116	2238 586 59812	0603 50V 100NP80M
2117	2238 586 59812	0603 50V 100NP80M
2118	2238 586 59812	0603 50V 100NP80M
2119	3198 030 74780	EL SM 35V 4U7 PM20 COL R
2120	2238 586 59812	0603 50V 100NP80M
2121	2238 586 59812	0603 50V 100NP80M
2122	2238 586 59812	0603 50V 100NP80M
2123	2238 586 59812	0603 50V 100NP80M
2124	2238 586 59812	0603 50V 100NP80M
2125	2238 586 59812	0603 50V 100NP80M
2126	2238 586 59812	0603 50V 100NP80M
2127	3198 030 74780	EL SM 35V 4U7 PM20 COL R
2128	3198 016 31020	0603 25V 1nF
2129	4822 126 13956	68pF 5% 63V CASE 0603
2130	3198 030 82280	EL SM 50V 2U2 PM20 COL R
2131	5322 124 41945	22μF 20% 35V
2132	2238 586 59812	0603 50V 100NP80M
2135	3198 030 74780	EL SM 35V 4U7 PM20 COL R
2136	4822 126 11785	0603 50V 47P PM5
2137	2238 586 59812	0603 50V 100NP80M
2139	2238 586 59812	0603 50V 100NP80M
2141	4822 126 11785	0603 50V 47P PM5
2146	2238 586 59812	0603 50V 100NP80M
2200	3198 016 31020	0603 25V 1nF
2201	4822 126 14494	22nF 10% 25V 0603
2202	2238 586 59812	0603 50V 100NP80M
2203	3198 030 74780	EL SM 35V 4U7 PM20 COL R
2204	2222 867 15339	0603 50V 33P PM5
2205	2238 586 59812	0603 50V 100NP80M
2206	2238 586 59812	0603 50V 100NP80M
2207	2222 867 15339	0603 50V 33P PM5
2208	2238 586 59812	0603 50V 100NP80M
2209	2238 586 59812	0603 50V 100NP80M
2210	2238 586 59812	0603 50V 100NP80M
2211	2238 586 59812	0603 50V 100NP80M
2212	2238 586 59812	0603 50V 100NP80M
2213	2238 586 59812	0603 50V 100NP80M
2214	2238 586 59812	0603 50V 100NP80M
2215	2238 586 59812	0603 50V 100NP80M
2216	2238 586 59812	0603 50V 100NP80M
2217	2238 586 59812	0603 50V 100NP80M
2218	3198 030 74780	EL SM 35V 4U7 PM20 COL R
2220	2238 586 59812	0603 50V 100NP80M
2221	2238 586 59812	0603 50V 100NP80M
2222	2238 586 59812	0603 50V 100NP80M
2223	2238 586 59812	0603 50V 100NP80M
2224	2238 586 59812	0603 50V 100NP80M
2225	2238 586 59812	0603 50V 100NP80M
2226	2238 586 59812	0603 50V 100NP80M
2227	2238 586 59812	0603 50V 100NP80M
2228	2238 586 59812	0603 50V 100NP80M
2229	2238 586 59812	0603 50V 100NP80M
2230	3198 030 74780	EL SM 35V 4U7 PM20 COL R
2231	2238 586 59812	0603 50V 100NP80M
2300	2238 586 59812	0603 50V 100NP80M
2301	2238 586 59812	0603 50V 100NP80M
2302	2238 586 59812	0603 50V 100NP80M
2303	2238 586 59812	0603 50V 100NP80M

2304	3198 030 74780	EL SM 35V 4U7 PM20 COL R	2528	2238 586 59812	0603 50V 100NP80M	3118	4822 117 12139	22Ω 5% 0.062W
2305	3198 030 74780	EL SM 35V 4U7 PM20 COL R	2529	2238 586 59812	0603 50V 100NP80M	3119	4822 051 30222	2k2 5% 0.062W
2306	2238 586 59812	0603 50V 100NP80M	2530	2238 586 59812	0603 50V 100NP80M	3120	4822 051 30153	15k 5% 0.062W
2307	2238 586 59812	0603 50V 100NP80M	2531	2238 586 59812	0603 50V 100NP80M	3121	4822 117 12917	1Ω 5% 0.062W CASE0603
2308	2238 586 59812	0603 50V 100NP80M	2532	2238 586 59812	0603 50V 100NP80M	3122	4822 051 30123	12k 5% 0.062W
2309	2238 586 59812	0603 50V 100NP80M	2533	2238 586 59812	0603 50V 100NP80M	3123	2322 704 62002	RST SM 0603 RC22H 2k PM1 R
2310	2238 586 59812	0603 50V 100NP80M	2534	2238 586 59812	0603 50V 100NP80M	3124	2322 704 63002	RST SM 0603 RC22H 3k PM1 R
2311	3198 030 74780	EL SM 35V 4U7 PM20 COL R	2535	2238 586 59812	0603 50V 100NP80M	3125	4822 117 12139	22Ω 5% 0.062W
2312	2238 586 59812	0603 50V 100NP80M	2536	2238 586 59812	0603 50V 100NP80M	3126	4822 117 12891	220k 1% ERJ3Ω
2402	2238 586 59812	0603 50V 100NP80M	2537	2238 586 59812	0603 50V 100NP80M	3127	4822 051 30479	47Ω 5% 0.062W
2403	3198 030 74780	EL SM 35V 4U7 PM20 COL R	2538	2238 586 59812	0603 50V 100NP80M	3128	4822 051 30479	47Ω 5% 0.062W
2404	2238 586 59812	0603 50V 100NP80M	2539	3198 030 74780	EL SM 35V 4U7 PM20 COL R	3129	4822 051 30479	47Ω 5% 0.062W
2405	2238 586 59812	0603 50V 100NP80M	2540	3198 030 74780	EL SM 35V 4U7 PM20 COL R	3130	2120 611 00019	NTC SM 0603 0W1 4k7 PM5 R
2406	2238 586 59812	0603 50V 100NP80M	2541	3198 030 74780	EL SM 35V 4U7 PM20 COL R	3131	4822 117 12917	1Ω 5% 0.062W CASE0603
2407	2238 586 59812	0603 50V 100NP80M	2542	3198 030 74780	EL SM 35V 4U7 PM20 COL R	3132	4822 117 12917	1Ω 5% 0.062W CASE0603
2408	2238 586 59812	0603 50V 100NP80M	2543	2238 586 59812	0603 50V 100NP80M	3133	4822 117 12917	1Ω 5% 0.062W CASE0603
2409	2238 586 59812	0603 50V 100NP80M	2544	2238 586 59812	0603 50V 100NP80M	3134	4822 117 12917	1Ω 5% 0.062W CASE0603
2410	2238 586 59812	0603 50V 100NP80M	2565	4822 122 33753	150pF 5% 50V	3135	4822 117 12917	1Ω 5% 0.062W CASE0603
2411	3198 030 74780	EL SM 35V 4U7 PM20 COL R	2600	2238 586 59812	0603 50V 100NP80M	3136	4822 117 12917	1Ω 5% 0.062W CASE0603
2412	2238 586 59812	0603 50V 100NP80M	2601	4822 126 11785	0603 50V 47P PM5	3137	4822 051 30472	4k7 5% 0.062W
2413	2238 586 59812	0603 50V 100NP80M	2602	4822 126 11785	0603 50V 47P PM5	3138	4822 051 30472	4k7 5% 0.062W
2414	2238 586 59812	0603 50V 100NP80M	2605	2238 586 59812	0603 50V 100NP80M	3200	4822 051 30332	3k3 5% 0.062W
2415	2238 586 59812	0603 50V 100NP80M	2606	4822 126 11785	0603 50V 47P PM5	3201	4822 051 30152	1k5 5% 0.062W
2416	2238 586 59812	0603 50V 100NP80M	2607	4822 126 11785	0603 50V 47P PM5	3202	4822 051 30103	10k 5% 0.062W
2417	2238 586 59812	0603 50V 100NP80M	2608	2238 586 59812	0603 50V 100NP80M	3203	4822 117 12139	22Ω 5% 0.062W
2418	2238 586 59812	0603 50V 100NP80M	2609	2238 586 59812	0603 50V 100NP80M	3204	4822 051 30101	100Ω 5% 0.062W
2419	2238 586 59812	0603 50V 100NP80M	2610	2238 586 59812	0603 50V 100NP80M	3205	4822 051 30101	100Ω 5% 0.062W
2420	2238 586 59812	0603 50V 100NP80M	2611	4822 126 11785	0603 50V 47P PM5	3206	4822 051 30101	100Ω 5% 0.062W
2421	2238 586 59812	0603 50V 100NP80M	2612	4822 126 11785	0603 50V 47P PM5	3207	4822 051 30103	10k 5% 0.062W
2422	2238 586 59812	0603 50V 100NP80M	2613	2238 586 59812	0603 50V 100NP80M	3208	4822 117 12139	22Ω 5% 0.062W
2423	2238 586 59812	0603 50V 100NP80M	2614	2238 586 59812	0603 50V 100NP80M	3209	4822 051 30103	10k 5% 0.062W
2424	2238 586 59812	0603 50V 100NP80M	2615	2238 586 59812	0603 50V 100NP80M	3211	4822 051 30222	2k2 5% 0.062W
2425	2238 586 59812	0603 50V 100NP80M	2616	4822 126 11785	0603 50V 47P PM5	3212	4822 051 30152	1k5 5% 0.062W
2426	2238 586 59812	0603 50V 100NP80M	2617	4822 126 11785	0603 50V 47P PM5	3213	4822 051 30103	10k 5% 0.062W
2427	2238 586 59812	0603 50V 100NP80M	2618	2238 586 59812	0603 50V 100NP80M	3214	4822 051 30103	10k 5% 0.062W
2428	2238 586 59812	0603 50V 100NP80M	2619	2238 586 59812	0603 50V 100NP80M	3215	4822 051 30103	10k 5% 0.062W
2429	2238 586 59812	0603 50V 100NP80M	2620	2238 586 59812	0603 50V 100NP80M	3216	4822 051 30103	10k 5% 0.062W
2430	2238 586 59812	0603 50V 100NP80M	2621	4822 126 11785	0603 50V 47P PM5	3217	4822 051 30101	100Ω 5% 0.062W
2431	3198 030 74780	EL SM 35V 4U7 PM20 COL R	2622	4822 126 11785	0603 50V 47P PM5	3218	4822 051 30101	100Ω 5% 0.062W
2432	2238 586 59812	0603 50V 100NP80M	2625	2238 586 59812	0603 50V 100NP80M	3219	4822 051 30103	10k 5% 0.062W
2433	2238 586 59812	0603 50V 100NP80M	2626	4822 126 11785	0603 50V 47P PM5	3220	4822 051 30103	10k 5% 0.062W
2434	2238 586 59812	0603 50V 100NP80M	2627	4822 126 11785	0603 50V 47P PM5	3221	4822 051 30103	10k 5% 0.062W
2435	2238 586 59812	0603 50V 100NP80M	2628	2238 586 59812	0603 50V 100NP80M	3222	4822 051 30103	10k 5% 0.062W
2436	2238 586 59812	0603 50V 100NP80M	2629	2238 586 59812	0603 50V 100NP80M	3223	4822 051 30222	2k2 5% 0.062W
2437	2238 586 59812	0603 50V 100NP80M	2630	3198 030 74780	EL SM 35V 4U7 PM20 COL R	3224	4822 051 30103	10k 5% 0.062W
2438	2238 586 59812	0603 50V 100NP80M	2632	2238 586 59812	0603 50V 100NP80M	3225	4822 051 30103	10k 5% 0.062W
2439	2238 586 59812	0603 50V 100NP80M	2633	2238 586 59812	0603 50V 100NP80M	3226	4822 051 30103	10k 5% 0.062W
2440	2238 586 59812	0603 50V 100NP80M	2634	4822 126 14494	22nF 10% 25V 0603	3227	4822 117 12139	22Ω 5% 0.062W
2441	3198 030 74780	EL SM 35V 4U7 PM20 COL R	2635	2238 586 59812	0603 50V 100NP80M	3228	4822 117 12139	22Ω 5% 0.062W
2442	2238 586 59812	0603 50V 100NP80M	2636	3198 030 74780	EL SM 35V 4U7 PM20 COL R	3229	2322 704 61303	RST SM 0603 RC22H 13k PM1 R
2443	4822 122 33741	10pF 10% 50V	2722	2238 586 59812	0603 50V 100NP80M	3230	2322 704 61303	RST SM 0603 RC22H 13k PM1 R
2444	2238 586 59812	0603 50V 100NP80M	2900	2238 586 59812	0603 50V 100NP80M	3231	5322 117 13042	3k9 1% 0.063W 0603 RC22H
2446	3198 016 31020	0603 25V 1nF	2901	2238 586 59812	0603 50V 100NP80M	3232	5322 117 13042	3k9 1% 0.063W 0603 RC22H
2500	3198 016 31020	0603 25V 1nF	2902	2238 586 59812	0603 50V 100NP80M	3234	3198 031 14720	RST NETW 1206 4X4k7 PM5 COL R
2501	2238 586 59812	0603 50V 100NP80M	2903	2238 586 59812	0603 50V 100NP80M	3235	4822 117 12917	1Ω 5% 0.062W CASE0603
2502	2238 586 59812	0603 50V 100NP80M	2904	2238 586 59812	0603 50V 100NP80M	3236	4822 117 13576	NETW 4 X 33Ω 5% 1206
2503	2238 586 59812	0603 50V 100NP80M	2906	2238 586 59812	0603 50V 100NP80M	3237	4822 117 13576	NETW 4 X 33Ω 5% 1206
2504	2238 586 59812	0603 50V 100NP80M	2907	3198 030 74780	EL SM 35V 4U7 PM20 COL R	3300	4822 051 30479	47Ω 5% 0.062W
2505	2238 586 59812	0603 50V 100NP80M	2908	2238 586 59812	0603 50V 100NP80M	3301	4822 051 30479	47Ω 5% 0.062W
2506	2238 586 59812	0603 50V 100NP80M	2909	4822 126 14247	0603 50V 1N5 COL R	3400	4822 051 30101	100Ω 5% 0.062W
2507	2238 586 59812	0603 50V 100NP80M	2911	2238 586 59812	0603 50V 100NP80M	3401	4822 051 30101	100Ω 5% 0.062W
2508	2238 586 59812	0603 50V 100NP80M	2912	4822 126 14247	0603 50V 1N5 COL R	3403	4822 051 30103	10k 5% 0.062W
2509	2238 586 59812	0603 50V 100NP80M	2914	3198 030 74780	EL SM 35V 4U7 PM20 COL R	3404	4822 051 30008	0Ω jumper
2510	4822 122 33761	22pF 5% 50V	2915	2238 586 59812	0603 50V 100NP80M	3405	4822 051 30332	3k3 5% 0.062W
2510	4822 126 14507	18pF 5% 50V 0603	2916	4822 126 14494	22nF 10% 25V 0603	3406	4822 051 30479	47Ω 5% 0.062W
2511	4822 122 33741	10pF 10% 50V				3407	4822 051 30181	180Ω 5% 0.062W
2511	4822 126 14507	18pF 5% 50V 0603				3408	4822 117 12139	22Ω 5% 0.062W
2512	2238 586 59812	0603 50V 100NP80M				3409	4822 117 12139	22Ω 5% 0.062W
2513	2238 586 59812	0603 50V 100NP80M				3410	4822 117 12139	22Ω 5% 0.062W
2514	2238 586 59812	0603 50V 100NP80M				3500	4822 051 30101	100Ω 5% 0.062W
2515	2238 586 59812	0603 50V 100NP80M				3501	4822 051 30101	100Ω 5% 0.062W
2516	2238 586 59812	0603 50V 100NP80M				3502	4822 051 30222	2k2 5% 0.062W
2517	3198 030 74780	EL SM 35V 4U7 PM20 COL R				3503	4822 051 30102	1k 5% 0.062W
2518	3198 030 74780	EL SM 35V 4U7 PM20 COL R	3100	4822 051 30103	10k 5% 0.062W	3504	4822 051 30681	680Ω 5% 0.062W
2519	3198 030 74780	EL SM 35V 4U7 PM20 COL R	3101	4822 051 30222	2k2 5% 0.062W	3505	4822 117 12139	22Ω 5% 0.062W
2520	3198 030 74780	EL SM 35V 4U7 PM20 COL R	3102	4822 051 30103	10k 5% 0.062W	3506	4822 051 30222	2k2 5% 0.062W
2521	2238 586 59812	0603 50V 100NP80M	3104	4822 051 30479	47Ω 5% 0.062W	3507	4822 051 30472	4k7 5% 0.062W
2522	2238 586 59812	0603 50V 100NP80M	3105	4822 051 30479	47Ω 5% 0.062W	3508	4822 051 30103	10k 5% 0.062W
2523	2238 586 59812	0603 50V 100NP80M	3106	4822 051 30479	47Ω 5% 0.062W	3513	4822 051 30681	680Ω 5% 0.062W
2524	2238 586 59812	0603 50V 100NP80M	3107	4822 051 30109	10Ω 5% 0.062W	3515	4822 117 12917	1Ω 5% 0.062W CASE0603
2525	2238 586 59812	0603 50V 100NP80M	3108	4822 051 30479	47Ω 5% 0.062W	3600	2322 704 65609	RST SM 0603 RC22H 56Ω PM1 R
2526	2238 586 59812	0603 50V 100NP80M	3109	4822 051 30479	47Ω 5% 0.062W	3601	5322 117 13059	560Ω 1% 0.063W 0603 RC22H
2527	2238 586 59812	0603 50V 100NP80M	3110	4822 051 30479	47Ω 5% 0.062W	3602	5322 117 13059	560Ω 1% 0.063W 0603 RC22H
			3111	4822 051 30472	4k7 5% 0.062W	3603	4822 051 30102	1k 5% 0.062W
			3112	4822 051 30472	4k7 5% 0.062W	3604	4822 051 30101	100Ω 5% 0.062W
			3113	4822 051 30472	4k7 5% 0.062W			

3605	4822 117 12917	1Ω 5% 0.062W CASE0603
3606	5322 117 13059	560Ω 1% 0.063W 0603 RC22H
3607	5322 117 13059	560Ω 1% 0.063W 0603 RC22H
3608	4822 051 30102	1k 5% 0.062W
3610	4822 117 12917	1Ω 5% 0.062W CASE0603
3611	5322 117 13059	560Ω 1% 0.063W 0603 RC22H
3612	5322 117 13059	560Ω 1% 0.063W 0603 RC22H
3613	4822 051 30102	1k 5% 0.062W
3615	4822 051 30101	100Ω 5% 0.062W
3616	5322 117 13059	560Ω 1% 0.063W 0603 RC22H
3617	5322 117 13059	560Ω 1% 0.063W 0603 RC22H
3618	4822 051 30102	1k 5% 0.062W
3619	4822 051 30561	560Ω 5% 0.062W
3620	4822 051 30222	2k2 5% 0.062W
3621	5322 117 13059	560Ω 1% 0.063W 0603 RC22H
3622	5322 117 13059	560Ω 1% 0.063W 0603 RC22H
3623	4822 051 30101	100Ω 5% 0.062W
3624	4822 051 30102	1k 5% 0.062W
3625	4822 051 30101	100Ω 5% 0.062W
3626	5322 117 13059	560Ω 1% 0.063W 0603 RC22H
3627	5322 117 13059	560Ω 1% 0.063W 0603 RC22H
3628	4822 051 30102	1k 5% 0.062W
3629	4822 051 30181	180Ω 5% 0.062W
3630	4822 051 30181	180Ω 5% 0.062W
3631	4822 117 12917	1Ω 5% 0.062W CASE0603
3632	4822 051 30561	560Ω 5% 0.062W
3633	4822 051 30561	560Ω 5% 0.062W
3635	4822 051 30101	100Ω 5% 0.062W
3636	4822 051 30181	180Ω 5% 0.062W
3637	4822 051 30101	100Ω 5% 0.062W
3638	4822 051 30222	2k2 5% 0.062W
3900	4822 051 30103	10k 5% 0.062W
3901	4822 117 12139	22Ω 5% 0.062W
3902	4822 117 12925	47k 1% 0.063W 0603
3903	4822 117 13632	100k 1% 0603 0.62W
3904	4822 117 12139	22Ω 5% 0.062W
3906	4822 051 30479	47Ω 5% 0.062W
3908	4822 117 12139	22Ω 5% 0.062W
3910	4822 051 30101	100Ω 5% 0.062W
3911	4822 051 30103	10k 5% 0.062W
3913	4822 051 30682	6k8 5% 0.062W
3914	4822 051 30479	47Ω 5% 0.062W
3915	4822 051 30479	47Ω 5% 0.062W
3916	4822 117 13632	100k 1% 0603 0.62W
3917	4822 117 12139	22Ω 5% 0.062W
3918	4822 117 13632	100k 1% 0603 0.62W
3919	4822 051 30101	100Ω 5% 0.062W
3920	4822 117 12139	22Ω 5% 0.062W
3921	4822 051 30103	10k 5% 0.062W
3922	4822 051 30682	6k8 5% 0.062W
3923	4822 117 13632	100k 1% 0603 0.62W
3924	4822 051 30152	1k5 5% 0.062W
3925	4822 051 30472	4k7 5% 0.062W



5100	4822 157 11717	BLM31P500SPT
5101	4822 157 11717	BLM31P500SPT
5102	4822 157 11499	BLM11P600SPT
5103	4822 157 11499	BLM11P600SPT
5200	4822 157 11499	BLM11P600SPT
5201	4822 157 11499	BLM11P600SPT
5202	4822 157 11499	BLM11P600SPT
5203	4822 157 11499	BLM11P600SPT
5204	4822 157 11499	BLM11P600SPT
5205	4822 157 11499	BLM11P600SPT
5207	4822 157 11499	BLM11P600SPT
5208	4822 157 11499	BLM11P600SPT
5209	4822 157 11499	BLM11P600SPT
5300	4822 157 11499	BLM11P600SPT
5302	4822 157 11499	BLM11P600SPT
5400	4822 157 11499	BLM11P600SPT
5402	4822 157 11499	BLM11P600SPT
5403	4822 157 11499	BLM11P600SPT
5404	4822 157 11499	BLM11P600SPT
5500	4822 157 11499	BLM11P600SPT
5501	4822 157 11499	BLM11P600SPT
5502	4822 157 11499	BLM11P600SPT
5503	4822 157 11499	BLM11P600SPT
5504	4822 157 11499	BLM11P600SPT
5505	4822 157 11499	BLM11P600SPT
5506	4822 157 11499	BLM11P600SPT
5507	4822 157 11499	BLM11P600SPT

5508	4822 157 11499	BLM11P600SPT
5600	4822 157 70651	12μH (NL322522T-120J)
5601	4822 157 70651	12μH (NL322522T-120J)
5602	4822 157 70651	12μH (NL322522T-120J)
5603	4822 157 70651	12μH (NL322522T-120J)
5604	4822 157 70651	12μH (NL322522T-120J)
5605	4822 157 70651	12μH (NL322522T-120J)
5606	4822 157 70649	4.7μH (NL322522T-4R7J)
5607	4822 157 70649	4.7μH (NL322522T-4R7J)
5900	4822 157 11717	BLM31P500SPT
5901	4822 157 11717	BLM31P500SPT
5903	4822 157 11499	BLM11P600SPT
5904	4822 157 11717	BLM31P500SPT
5905	4822 157 11499	BLM11P600SPT
5907	4822 157 11499	BLM11P600SPT



6500	4822 130 80622	BAT54
6900	4822 130 80622	BAT54



7100	9352 692 48557	IC SM SAA7333HL/M1 (PHSE) Y
7101	9322 166 67668	IC SM MT48LC4M16A2TG-7E(MRN0)R
7102	5322 209 16384	PC74HCT9046AD
7103	9322 170 16685	IC SM NC7SZ58 (FSC0) R
7104	9352 456 50115	HC1G04
7200	9322 169 81671	STI5508EVB
7201	9322 130 41668	IC SM M24C64-WMN6 (ST00) R
7202	4822 209 30212	PC74HCT125T
7203	9322 142 88668	IC SM LF25CDT (ST00) R
7300	9322 166 67668	IC SM MT48LC4M16A2TG-7E(MRN0)R
7303	9352 499 60118	IC SM 74LVC00AD (PHSE) R
7402	9322 166 67668	IC SM MT48LC4M16A2TG-7E(MRN0)R
7403	9352 701 80557	IC SM SAA6752HS/V101 (PHSE) Y
7404	9322 142 88668	IC SM LF25CDT (ST00) R
7500	9352 673 95518	IC SM SAA7118E/V1 (PHSE) R
7501	9352 500 60118	IC SM 74LVC32AD (PHSE) R
7502	5322 209 71589	74HC74D
7504	5322 130 60159	BC846B
7600	5322 130 60159	BC846B
7601	5322 130 60159	BC846B
7602	5322 130 60159	BC846B
7603	5322 130 60159	BC846B
7604	5322 130 60159	BC846B
7605	5322 130 60159	BC846B
7606	5322 130 60159	BC846B
7702	9352 501 00118	IC SM 74LVC86ADB (PHSE) R
7900	9322 151 71668	IC SM MK2703STR (MICL) R
7901	5322 130 60159	BC846B
7902	9322 165 15685	IC SM NCP303LSN30 (ONSE) R
7904	4822 209 16399	74LVC04AD
7905	5322 209 71568	PC74HCT14T
7906	4822 242 10838	27MHZ 120P FX0-31FT